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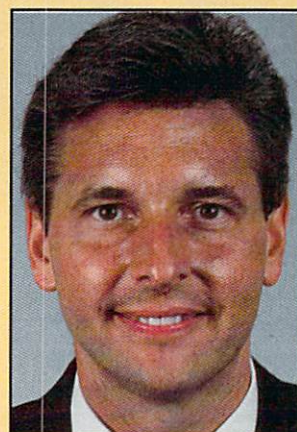


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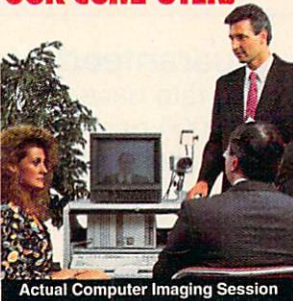
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64/128 VIEW

More Commodore user groups emerge as a new generation of 64 and 128 owners discover the machines' appeal.

Tom Netsel

Last month, we printed an updated listing of about 90 Commodore user groups. Then, just as that list was rolling off the presses, I learned of yet another new group.

An envelope arrived containing a letter, a disk, and Issue 1, Volume 1 of a newsletter from the Carbonaro Commodore Users Group in Valley Stream, New York. The newsletter was a one-pager that contained a lot of information. In fact, I don't remember when I've seen so many words squeezed onto one sheet of paper.

The newsletter contained a welcome from the editor, information about the companion disk, and tips on turning your disk drive into a racehorse with JiffyDOS. Among other items were concise reviews of Rocket Ranger and Who Framed Roger Rabbit?. The reviewer liked Rocket Ranger's graphics, soundtracks, and digitized voices, so he gave it an A+. Roger Rabbit was criticized for not having different playing levels, so it got an A-.

Since this was the first issue, the Questions Forum was empty, but the editor requested that readers send him their Commodore-related questions. The address for those questions was a little odd, however. To submit a question, readers are instructed to jot it on a note and deliver it to the editor, John Edward Everson, in Miss Celona's sixth-grade class, room 10 at R. W. Carbonaro School in Valley Stream. Oh, yes—John requests that you include your name, class, grade, and room number with your questions. He'll answer your

questions to the best of his ability and expertise and, if necessary, seek further information on QuantumLink.

The Carbonaro Commodore Users Group is open to 64 and 128 users at the school and to Commodore users in the community, as well. Just because the editor is in the sixth grade, don't think he's a lightweight when it comes to knowing his way around a computer. The accompanying disk—which came free with the first issue of the newsletter but will cost \$1 from now on—contains two of John's programs. One of these, Bowman, made the top ten download list on Q-Link for several months last fall.

John, who has access to several computers, chose a 128 with Paperclip Publisher to produce his newsletter. The 128 has a 50MB hard drive and a 13MB RAMLink, and it's connected to a Star NX-1000 color printer. It's not exactly a lightweight system, but John's father is also an avid Commodore fan.

Through word of mouth, the Carbonaro user group has grown considerably in just a short time, and John is sending out several hundred copies of his newsletter each month. As I write this, another issue is about ready to hit the school corridors and mailboxes across the country.

In a day when many user groups are closing their doors, it's refreshing to hear about a new one being started by a new generation of 64 and 128 users. We at Gazette want to wish John good luck with his newsletter and hope the Carbonaro User Group prospers. □

GAZETTE

64/128 VIEW

G-1

A new generation of computer users is discovering the 64 and 128. One young enthusiast has started a user group at school and has his own newsletter. By Tom Netsel.

FEEDBACK

G-2

Questions and comments from our readers.

D'IVERIONS

G-6

The grand-prize winner of the Design-a-Robot Contest is Gordon H. Smith of Kenosha, Wisconsin. His winning robot is named GOLMER. By Fred D'Ignazio.

BITS, BYTES, AND BLOOPERS

G-8

Have you ever done something stupid while working at your computer? Cheer up. When it comes to computer boo-boos, you aren't alone. By Julia L. Wilkinson.

REVIEWS

G-14

Back to the Future Part III, Goofy's Railway Express, and Donald's Alphabet Chase.

PROGRAMMER'S PAGE

G-18

Here are some dazzlers to show off your machine. By Randy Thompson.

BEGINNER BASIC

G-22

Learn to write an amortization program so you can check your bank's or mortgage company's figures. By Larry Cotton.

GEOS

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Fonts are an exciting aspect of using GEOS, and literally hundreds of them are available. By Steve Vander Ark.

PROGRAMS

Milk Run	G-25
Turbo Poker	G-29
File Lord	G-30
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Batch File 64	G-38

Machine Language Demos

Could you tell me what I need to make superb demonstration programs in machine language? To help me learn about the 64 and machine language programming, I have purchased COMPUTE's *Commodore 64/128 Power BASIC*, *All About the Commodore 64*, *Mapping the Commodore 64*, and *Machine Language for Beginners*.

STEVEN MCCLAUGHERTY
HURRICANE, WV

The books you've purchased are a great beginning for learning and applying machine language for the 64. Machine language programming can be broken into two broad groups: machine specific and machine general. Machine specific programming takes the properties of the computer itself into account, often making use of built-in machine routines, such as those from BASIC or the disk operating system. Using these routines to handle many essential computer functions frees the programmer from a lot of tedious programming.

In order to use existing routines, however, you need to know what routines the computer uses to do its job and what the routines do. Do they need values passed to them to work? Do they return values? How do they affect the operation of the computer? You'll also need to know the logical internal arrangement of the computer, how the memory is laid out, and how to access these locations and manipulate the associated data.

Each microprocessor has its own set of codes for machine language. You need to know these commands, or at least be familiar with the group of mnemonics. This is where an assembler comes in handy as a programming aid.

As to the other broad divi-

sion of machine language programming, general ML, there are some fundamental rules and standard operations. All of this sounds like an awful lot to learn, but you can start small and build up your knowledge. Because everything in the computer is interrelated in some way, it all falls into place with time. Applications can then be found for your knowledge as you learn. Thinking in machine language terms is a departure from thinking in high level languages such as BASIC, but the learning curve is no steeper. So plunge in and have fun!

Orderly Directories

Is there any program for altering the sequence of files in a directory or for listing directory files alphabetically?

GLEN M. SHUE
SILVER SPRING, MD

There are several. Commodore provides such a utility with its disk drive test/demo disk for the 1541 and other drives, and COMPUTE's Gazette published one called *Directory Magic* (October 1987). *Directory Magic* lets you alphabetize, change file names, and move entries where you want them. You can also scan the contents of both programs and text files.

A copy of this disk and any Gazette Disk earlier than June 1990 can be had for only \$3.50. Order by writing to Single Gazette Disk Sales, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. Be sure to specify the month and year of the desired disk. A copy of *Directory Magic* can be also be found for downloading in our COMPUTE/NET area of Quantum Link. Also, you may find several utilities of this kind in user group archives and on local bulletin board systems and networks.

Mind-Reading 64

Can you help me with a program that would appear to read people's minds? If someone held up a pencil, I would type in "Please tell me what this person is holding," and the computer would display PENCIL. If the person held up a computer disk, I would type "Describe this item," and the computer would display DISK. The secret would be that the first letter of the item name would correspond with the first letter I type in when I ask what the item is.

EARL WALKER
LANSDALE, PA

Here's a BASIC program that should do what you need.

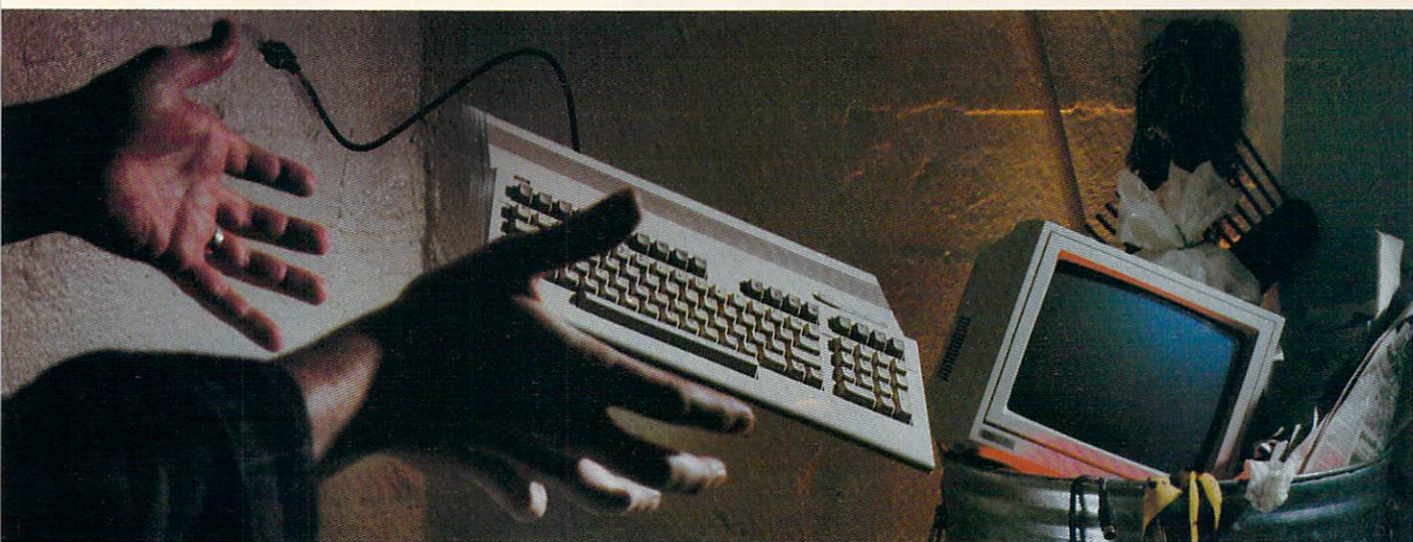
```
HF 10 INPUT "{CLR}{DOWN}
{N}WHAT NUMBER OF
{SPACE}ITEMS";N:DI
M I$(N)
CJ 20 FOR X=1 TO N:PRINT
"WHAT'S ITEM";X:I
NPUT I$(X):NEXT
JE 30 PRINT "{CLR}
{2 DOWN}THE AMAZIN
G COMPUTINI!"
RK 40 PRINT:PRINT:INPUT"
WHAT IS YOUR QUEST
ION";Q$:PRINT
XA 50 FL=0:FOR X=1 TO N:
IF LEFT$(Q$,1)=LEF
T$(I$(X),1) THEN F
L=X
GJ 60 NEXT
QK 70 IF FL>0 THEN PRINT
"THAT IS ... ";:FO
R X=1 TO 1000:NEXT
:PRINT I$(FL):GOTO4
0
MG 80 IF FL=0 THEN PRINT
"I'M STUMPED ON TH
AT ONE!":GOTO40
```

Line 10 sets up an array according to the number of items involved. Notice that by pressing Ctrl-N we are using upper- and lowercase letters in the program.

Line 20 asks the magician for the item names. If the first letter of your question in line 40 starts with a capital letter, then the item you enter must also start with a capital letter if it's to match. (Don't let your audience see you enter data

Questions
and answers about
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and more

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CZ052

Where to find read/write heads and how to program with EPROMs

for these first two lines.)

Line 30 prepares the screen for the first question from the magician. In line 40 the program accepts the question then moves to line 50 to see if the first letter of the item corresponds to the first letter of the question. Remember, the case must also agree if there's to be a match.

If a corresponding item is found, line 70 prints the word—after taking a dramatic pause. If there's no match, the program moves to line 80 to report that it's stumped. Either way, the program then returns to the prompt for a new question.

This is just the basic program. You can add your own bells and whistles later. You may want to save lists of items to disk, add spooky graphic effects and sounds, and so on to make the program more entertaining.

Read/Write Heads

My local Commodore service technician has advised me to replace the read/write heads in my 1571 disk drive. Distributors, meanwhile, haven't been able to suggest anything better than purchasing a new drive unit. Can you tell me how to get a read/write head set without buying an entirely new disk drive?

LODOVICO BONINSEgni
CURRIDABAT, COSTA RICA

Our information, which we got from a local service technician, is that read/write head sets have been discontinued. Instead, the closest option is to have your technician order a 1571 drive assembly (part number 252092-01). As of late 1991, it has a suggested retail price of \$148.50.

EPROMs and HEX

I would like to know how to put a program on an EPROM and then make the 64 recog-

nize the EPROM's presence. I would also like to know where I can find a cross reference to hex characters, such as those in MLX listings.

JOSEPH YARMEL
NANTICOKE, PA

Erasable programmable read only memory (EPROM) is a chip upon which a program or group of programs can be stored. To program the chip requires a piece of hardware called, naturally enough, an EPROM programmer. The chips may also be erased and reused. For the professional programmer and hobbyist alike, EPROMs allow a quality alternative to software packaging with a high level of protection from both physical and software abuse. When an EPROM cartridge board is plugged into the 64 expansion port, its contents are found from memory address 32768 (\$8000) onward.

EPROMs come in several capacities, such as 4K bytes (16 CBM disk blocks), 8K (32 blocks), 16K (64 blocks), 32K (128 blocks), and 64K (256 blocks). Code painted on the EPROM identifies its capacity. A popular series of EPROMs is the 2700 series, whose code is a 27 followed by the capacity in kilobits. For example, with the NEC D27128D EPROM you would divide the 128, indicating 128 kilobits, by 8 to discover that its capacity is 16 kilobytes or divide by 2 to find that the equivalent in disk storage is 64 blocks.

Once you've installed your program on this chip, you're ready to make your software autobooting. One of the first things the Kernal RESET routine does is check locations 32772-32776 (\$8004-08) for the string of characters CBM80 (HEX C3 C2 CD 38 30). If these exact characters aren't found, the Kernal RESET process continues.

If the CBM80 is found, the RESET routine is interrupted, and the processor immediately jumps to whatever location is specified by the cartridge cold-start vector. This vector is expected to be found at locations 32768-32769 (\$8000-01). A pointer must be placed here, in standard low byte/high byte order, directing the processor to the beginning of the cartridge code. From that point on, your cartridge software must handle all the initialization itself for any functions it will use, such as the I/O devices or Kernal or BASIC routines. The Kernal initialization routines are, of course, still available to be called upon for this. Unless you know exactly what you're doing, your cartridge should use these routines to initialize the functions it needs. For EPROM supplies, call Jason-Ranheim at (800) 421-7731.

The second part of your question is easy. Hex, short for hexadecimal, or base-16 numbering, is an easy, two-character way of representing all 256 possible values that might be contained in the 64's memory. You can't tell anything from these numbers themselves. A particular value might be a number, letter, or other kind of data. It could also be part of a machine code command or an address in a jump table. If you want to examine a program, you'll have to view it with a disassembler. You can't really tell anything from a MLX listing. However, if you want to know the text equivalents of hex codes for, say, screen printing, take a look at the table in the Commodore 64 Programmer's Reference Guide.

Send your questions and comments to Gazette Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. □

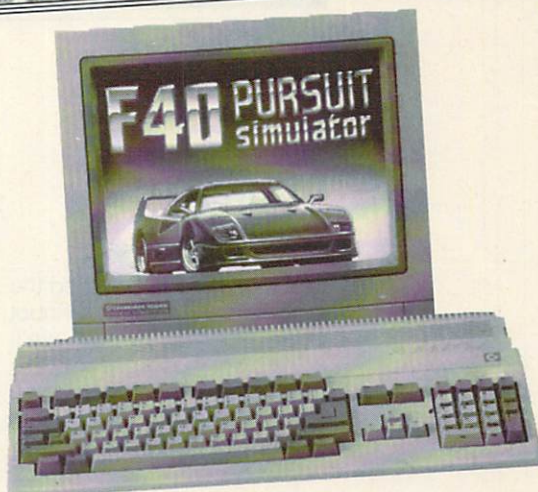
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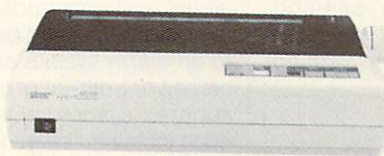
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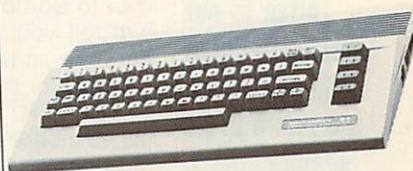
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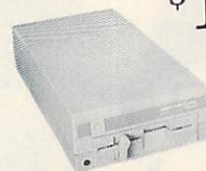
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G5V

D'IVERIONS

Fred D'Ignazio

GOLMER THE ROBOT

Last month we announced the winners of the Design-a-Robot Contest. This month we'll point the spotlight at the grand prize winner, Gordon H. Smith of Kenosha, Wisconsin, and his robot GOLMER.

GOLMER is an unusual name, even for a robot. It stands for Gordon's Own Little Mechanical Electrical Robot. GOLMER was the most impressive contest entry that I received. The package included photographs, hardware diagrams, program listings, even an Interface Report.

Now, I'll turn the column over to Gordon Smith and let him tell you what GOLMER can do now and what's planned for the future.

GOLMER is a self-contained mobile robot with external controls. At the present

time GOLMER is slow, and his abilities are limited. He was designed to go to the refrigerator and get me something to drink. When he can do that, I will consider him useful, but he'll never be finished. There will always be upgrades.

He'll have on-board logic to avoid obstacles and will be able to communicate with an external computer through FM radio signals. This will allow him to receive complicated commands and to send status reports to the main computer.

Status reports will include distance and direction traveled, path taken, and position of each moving part on the robot. Also, there will be an adjustable light source and indicators for running time and estimated power remaining. In the future I may add to his circuits a thermometer, a smoke alarm, and an intruder detector. GOLMER could be tied into an alarm system and have his own built-in protection, such as a squirt gun. I may even install an ultrasonic pest repellent for ants, mice, mosquitoes, bees, and so on.

GOLMER's design is patterned after Johnny Five in the movie *Short Circuit*. I like this design because it can fold itself into a small package. The head is patterned after the security robots in the movie *Chopping Mall*. Much of GOLMER's design is based on a *Radio Electronics* article from 1981, "How to Build Your Own Robot for Under \$400." The main principle involves sending touch-tone frequencies over a walkie-talkie. GOLMER decodes the frequencies into functions.

GOLMER uses two basic programs, one written in 8088 assembly language and one written in C. Both do the same thing. A menu lets you sample incoming data from eight data switches or eight feedback ports, or you can send out numbers that will turn on any or all

of eight outputs. With eight binary inputs or outputs, each digit can represent a number from 0 to 255. With a microprocessor on board, this number can give you 256 separate commands. Each command could initiate a series of tasks.

I would like to use infrared light to avoid obstacles and to locate objects to pick up. Infrared could be transmitted through fiber optics to the hands to detect objects. Hall effect sensors could detect metal objects, and ultrasonics could be used to measure distances in order to map a room for future reference.

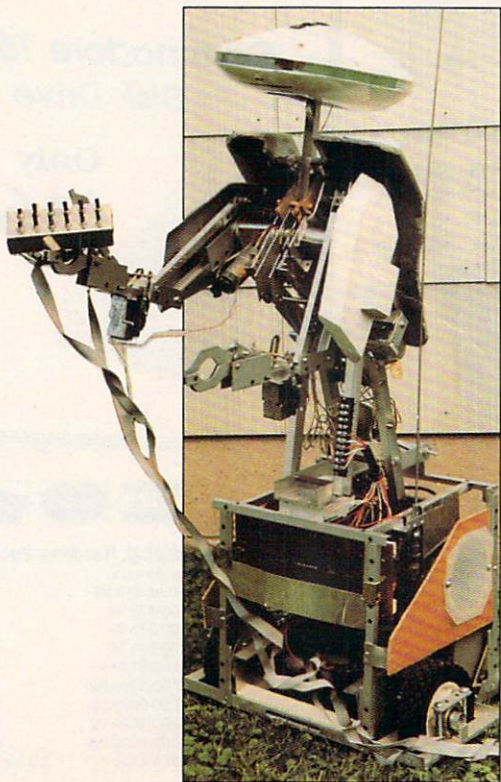
A JAEMCO speech synthesizer will be added to give GOLMER a voice. I want to give him ears, but that's much more complicated. An existing voice-detection circuit has only five commands built in: forward, reverse, left, right, and stop. It would be nice to pick up sounds with a microphone and try to compute a response to spoken language.

My interest in robots began when I was ten years old, watching *Lost in Space*. Twenty years later I tried to build the robot that appeared in the series. It looked good, but I found out I didn't know enough about the robotics. So I took a course in the subject at Gateway Technical College in Kenosha, Wisconsin. I built GOLMER as a final project.

I am trying to complete work on GOLMER so I can use it to start a robot rental business. If that works out, I would like to manufacture robots for entertainment and for useful tasks like housecleaning and aiding the handicapped.

GOLMER is a success at entertaining and making instant crowds. Children of all ages want to see GOLMER again and again. They want a robot of their own; they want to know how to get one or how to make one. Everyone needs one. □

**Gordon Smith's
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prize in our
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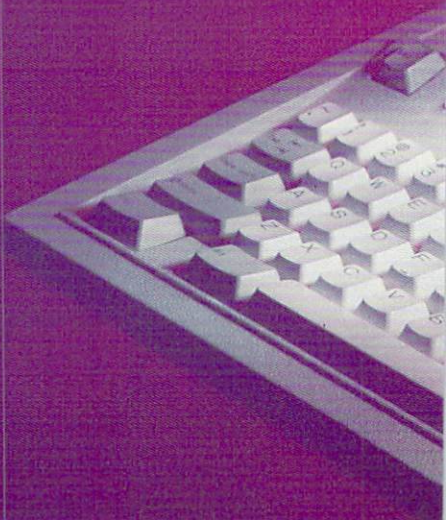


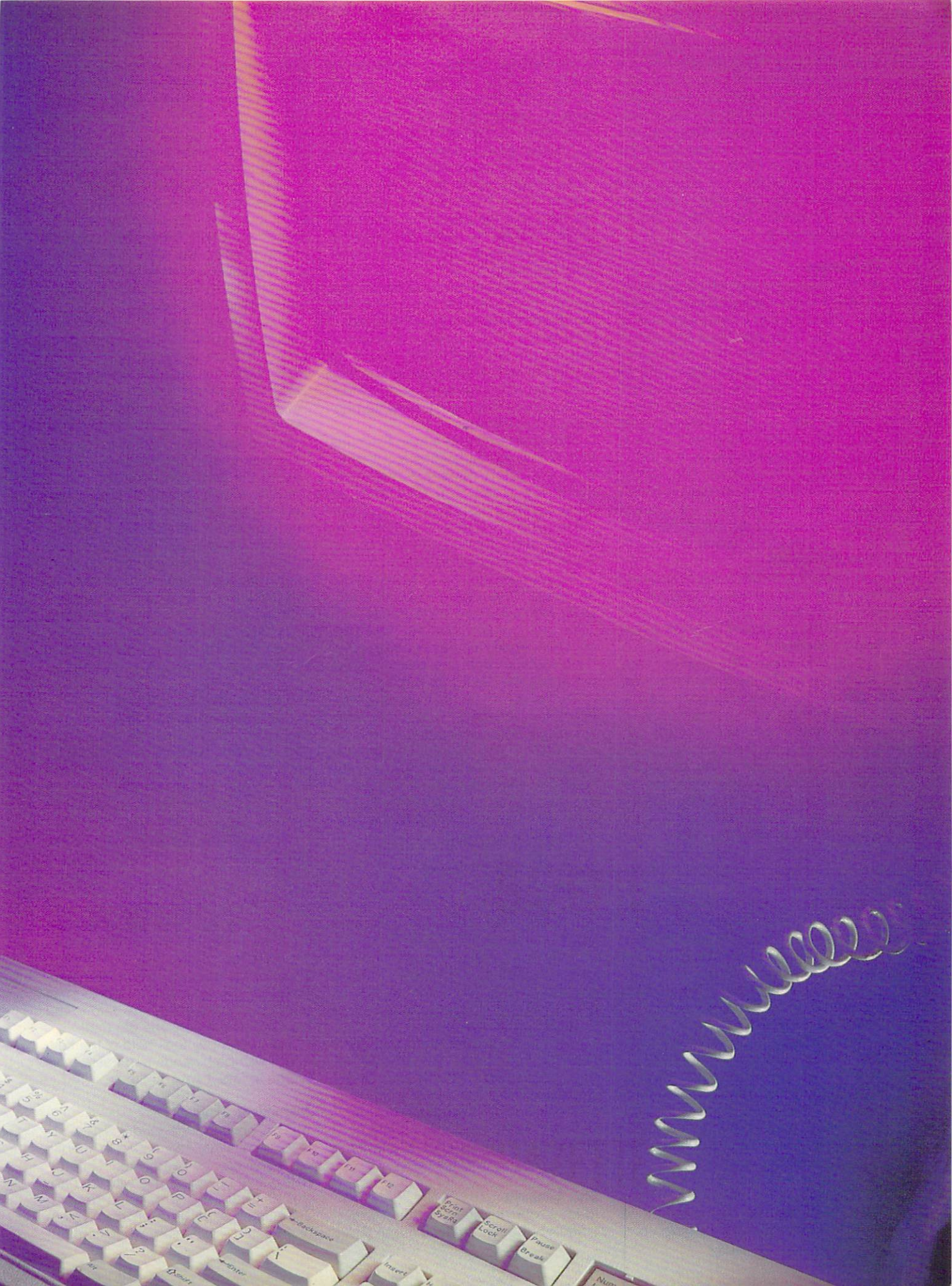
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BOO-BOO? YOU AREN'T ALONE.

BITS, BYTES, AND BLOOPERS

BY JULIA L. WILKINSON

So you made a stupid mistake. Mistakes are to be expected, especially when you're learning something. Since working with computers is a continuous learning process, you should expect to make your share of blunders. Perhaps you can take some solace in the fact that other people are doing the same silly things—and some even sillier.





If you're one of those people who are berating their momentary idiocy, take heart. Worse things have been done while worshipping at that silicon altar. Take a minute to peruse these disconcerting anecdotes from the Computer Boo-Boo Hall of Fame. If you've been guilty of one of these mistakes, take comfort in the fact that you're not alone. No names have been used for obvious reasons.

On Campus

A Penn State student who'd just completed a paper using MacWrite asked the computer lab consultant how to print it. He responded that she should pull down the File menu and select Print. The ensuing blank stare told the consultant that the student didn't know how to use a pull-down menu. "See that little arrow?" he asked, pointing to the screen. "Use the mouse to move it to the word *File* at the top of the screen. Then hold the button down and drag it downward until you reach *Print*." The student then picked up the mouse, put it against the monitor, and began to move it up and down the screen.

A University of Delaware student approached a lab consultant and said, "I can't find the Any key."

"What do you mean?" asked the confused consultant.

"Oh, you know," the student said, "right here where the program instructions say, 'Hit any key to continue.'"

Mainframe computer systems at schools and universities normally permit access by students and faculty. To protect each person's files, programs, and electronic mail, however, most systems require a password from the user. A student logging on to the computer at one large university had to abort this process when it came time to select a password. He couldn't think of a six-letter word.

A Carnegie Mellon University student tried to log on to the CMU computer by entering his user identification number (USERID) from the College of William and Mary.

Another student tried to log on to the mainframe using the serial number of his PC as a USERID.

A student was told to put the system disk and one data disk into a Macintosh. She put the two 3½-inch disks on top of each other and crammed them both into the same drive. Along the same lines, another computer novice tried to jam a disk into the slight opening between the A and B drives.

Do As I Say

These mistakes may seem silly, but we should bear in mind that the instruction-

al terminology is often not accurate or specific enough. It's the old story of a person who religiously follows the directions for making a peanut butter sandwich. When instructed to place the peanut butter on the bread, the person sets the entire jar on the slice.

That might explain why when a consultant told a customer over the telephone to put the disk in the drive and close the door, he heard the sound of footsteps followed by the sound of a door slamming.

Another gentleman complained that his manual instructed him to "remove the diskette and hold for transmission." That wasn't too helpful. He held the disk for an hour and a half, and nothing happened. Many tales are told of folks who, when asked to send copies of their disks, comply by sending photocopies of them.

High-level executives aren't immune from following instructions too literally. A senior vice president of marketing called in a problem on a Saturday afternoon: "This darn thing says, 'Press f10 to continue.' I've pressed the F, the 1, and the 0 keys at least a dozen times, and nothing happens!"

A customer called a computer store and said, "I've read the book about DOS. Now what about the don'ts?"

Another person thought "take disk out of envelope" meant prying the magnetic medium from the black plastic, not taking the plastic from the sleeve.

This is not to say that users are totally at fault for these kinds of misunderstandings. As one contributor to this article wrote, "Why should we consider the use of a mouse to be intuitive or assume that someone using a word processor for the first time will know that his work will disappear if he pulls the power plug from the wall?"

That's Not What I Meant

People often take computer jargon literally. Who can blame them, when the terminology often has additional, more common meanings? One computer expert bumped into this problem when writing a memo in response to a request from 3M, asking him to explain why a certain company was having problems with disk failures.

His memo stated that the disks were failing because of head crashes, and counseled, "If the customers would just clean their heads periodically, they wouldn't have this problem."

To which the customer replied in all seriousness, "What kind of shampoo do you recommend we use?"

Disk Dilemma

Many problems stem from misunderstandings about the handling of disks.

One man who had problems with a backup called a technician, who discovered the man's disks were bent like half-moons. When the technician asked what had happened to them, the man said they always looked like that after he typed the labels on them.

One writer was told she should never write on the disk label with a ballpoint pen, so she used pencil and erased it each time she made a change. When the disk finally failed, she lost several chapters of her book. She had to rewrite them from notes and intermediate printouts.

Then there was the guy who couldn't figure out why his disks wouldn't work in his 3½-inch drive. He'd taken the larger 5¼-inch ones and trimmed them exactly to size.

Disk labels pose another problem. Not everyone realizes the label is supposed to fold over the back of the 3½-inch disk shell. One computerist had placed the label over the front side of the disk without folding it. It extended over the metal sleeve that has to slide open to access the disk itself. Another disk glitch has to do with loss of information. A woman wanted to make sure hers were safe, so she secured the disks to the side of her monitor—with magnets. Other office personnel have been known to keep their disks handy by hanging them on magnets stuck to the side of a filing cabinet.

Out of the Mouths of Babes

Sometimes it takes a child to make us realize how truly far we still have to go. One man who had just bought a 64 for his kids showed them a game which drew simple shapes on the screen. It used D for draw, M for move, C to change the color, and so on.

It may not be all that exciting for us, but the kids got a kick out of doing it. Imagine the man's surprise when he returned to where he had left his four-year-old son playing with the computer and saw a screen full of circles, squares, triangles, and colors, including some interesting geometric shapes that required options and functions that should've taken days to master. "Wow, that's great!" he said to the boy. "Show me how you did that!"

The young boy took hold of the keyboard with both hands and bashed his forehead into it several times.

Journalistic Bloopers

Ah, the power of the media! The ability to disseminate information to millions of people can be heady stuff. Unfortunately, that power carries with it a danger as well. The wrong information sometimes slips through the system undetected—especially when comput-

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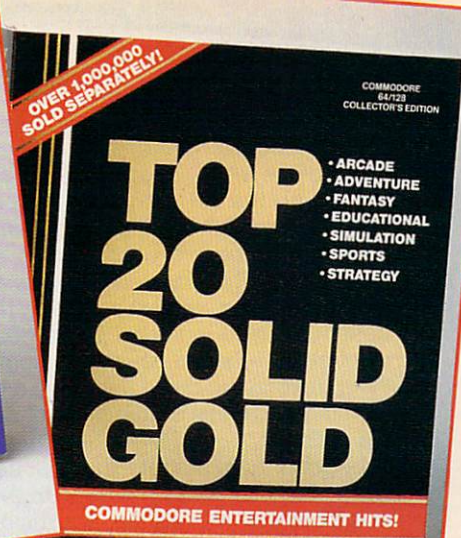
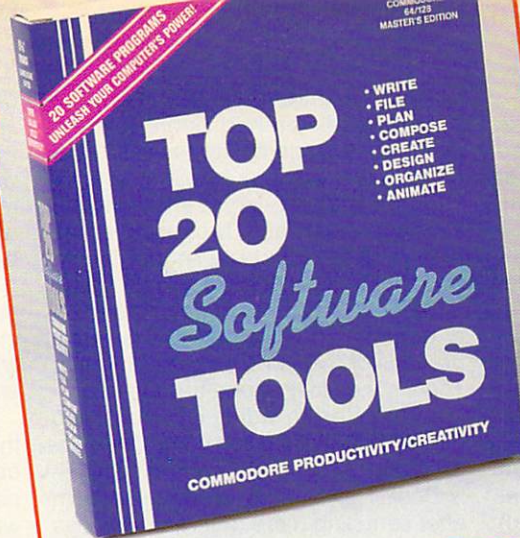
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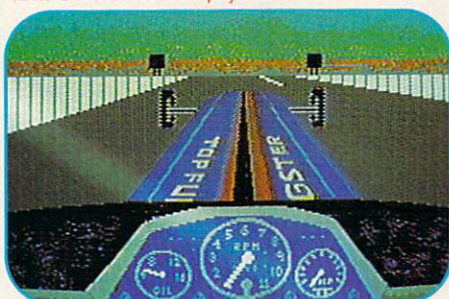
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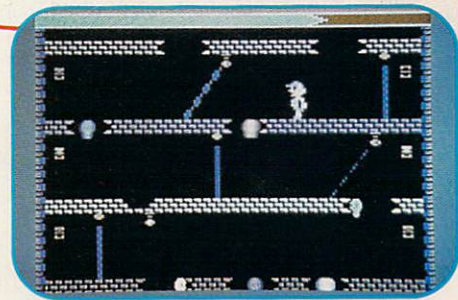
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ers are used to file stories.

One journalist tells the story of a wire-service reporter in an Associated Press office who wrote a letter to her mother on the AP computer system. The letter was full of enthusiastic references to the neat new computers AP had just bought, followed by extremely disparaging remarks about the boss. She also included some comment about how you could type something there in the office and have it go from that computer to hundreds of media outlets.

Legend has it that, as you can guess, the letter was transmitted to every radio station in the state, and the author was fired. Now, AP apparently has a rule that no personal correspondence is allowed on its computers.

And speaking of radio stations, computers have been responsible for some interesting bloopers there, too. A couple of years ago, a newsman at a Seattle station read an erroneous headline over the air. It dealt with a senator who had been found naked and drunk outside a Washington, D.C., nightclub.

The headline was promptly retracted two minutes later. Apparently, a staffer who was about to resign from the station had put a set of fake headlines into the station's BASYS computer sys-

tem as a joke. Everyone thought the bogus headlines had been deleted, but a copy evidently appeared in the backup of the sports headline set.

Best—or worst—of all, among those listening to the radio broadcast at the time, in a car with his wife and family, was the senator himself.

Probably the most frequent computer glitch that afflicts reporters is losing portions of their work to the computer. There's the story of one newsman during the Carter administration who threw himself a little too much into covering the unveiling of the ephemeral Billy Beer. He returned to the newsroom after sampling more than a few bottles of the product, ready to input his magnum opus into the paper's computer.

After much fevered typing, he realized, two minutes to deadline, that he'd typed the entire story on a directory screen rather than saving it to a file. In his panic, he hit the Store button, which made the whole thing disappear forever. It's said that was the last time that particular reporter was ever sent to cover any event where alcohol was on the menu of items being served.

There are many ways to lose a story when working with computers. Another reporter spent an hour or so toiling over a long story without saving it to

disk. He leaned back in his chair and stretched, with his arms behind his head, and the chair went over backward. As the reporter tumbled, the toe of his shoe caught on the power cord and yanked it out of the wall. Good-bye, story.

Rumor has it that a certain Gazette editor has done a similar thing on more than one occasion by accidentally hitting the On/Off switch on the power strip beneath his desk.

Sometimes it's an external force that causes a user to lose work. One computerist recalls with woe an evening in his apartment when he'd been writing for four hours without saving. Just as he was about to hit the Return key to save his work, a drunken driver crashed into a pole outside the apartment, killing power to the building.

Experts Fall Victim

Even seasoned computer consultants goof up now and then. One admits to calling the repairman when his printer wouldn't print. He had it plugged into the wrong port. Another consultant once confused her modem and mouse cables.

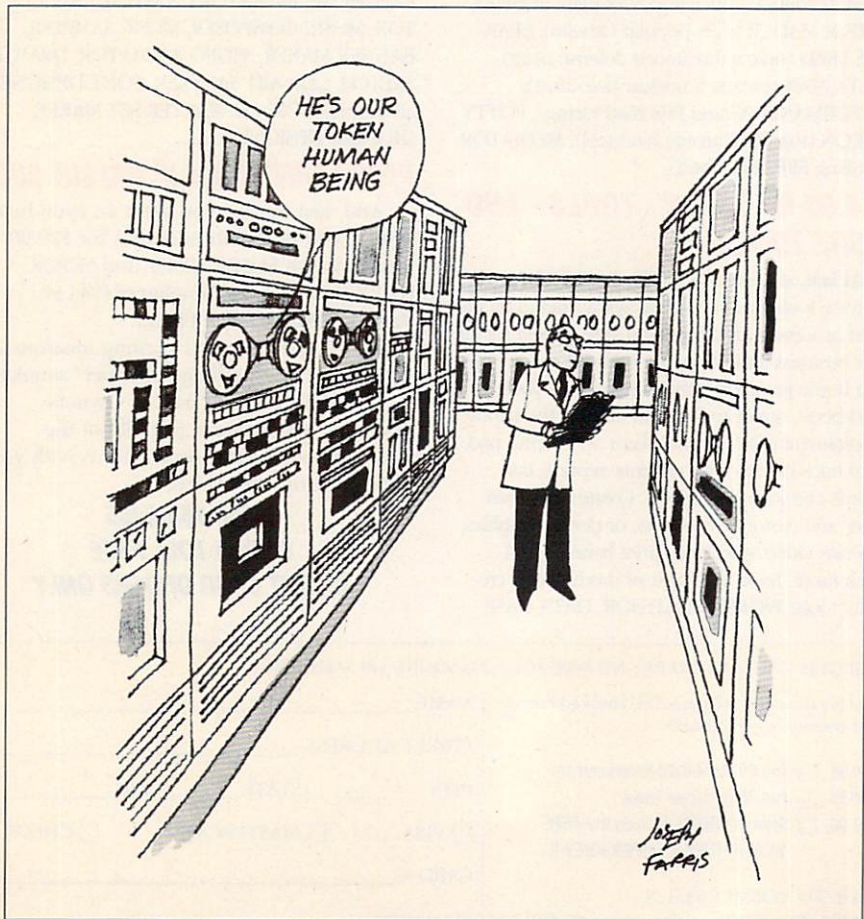
A systems programmer beat on his machine for half an hour, screaming because it wouldn't work. Everything apparently checked out, but nothing appeared on his monitor. He had the contrast turned all the way down.

In the data-processing department of a hospital, someone thought it would be nice to have some sturdy canvas dust covers for the CRTs. Late one night, an employee was going to the snack bar and smelled something like burning electronics coming from that office. Luckily, there was no fire, but now the office staff knows it's a good idea to turn off a monitor before putting a dust cover over it for the night.

Try the Obvious

Sometimes the most obvious is the last thing tried. A computer consultant tells the story of a personnel clerk who called, explaining that her computer just showed a blank screen and wouldn't do anything. When he asked if the computer was turned on, she scolded him vehemently for impugning her integrity, informing him that she had graduated from a prestigious college and certainly had enough common sense to turn the computer on. Unfortunately, she didn't have enough common sense to plug it in.

Julia Wilkinson is a freelance writer and telecommunications junkie based in Virginia. She admits to making stupid mistakes frequently. □



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BACK TO THE FUTURE PART III

OK. So I don't play arcade games that often. To appeal to me, a game has to be really good. It has to entice me into it and make me want to continue playing. It has to be challenging enough so that I can't master it immediately, but it has to be masterable.

It has to have good sound, good graphics, and a clever plot line. If it's grounded in some other fiction or reality, such as a television show or current event, so much the better. The rules have to make a certain sense, and the program must create a reality of its own. This requires smooth programming. I want to be able to lose myself in the game, not get lost in its complexities. This is a tall order to be sure, but this is what a program needs if it's to attract me. Back to the Future Part III has what it takes.

One small confession: None of our test team, Dave and Robin (the adults) and Meaghan (the kid), was able to get past the first level of this game. We kept trying, but we couldn't get close enough to break the barrier into the second level. Of course, this means that there's a lot to the program we can't comment on. You can tell a lot about a game from its first level, however; it lets me know whether I want to play it or not.

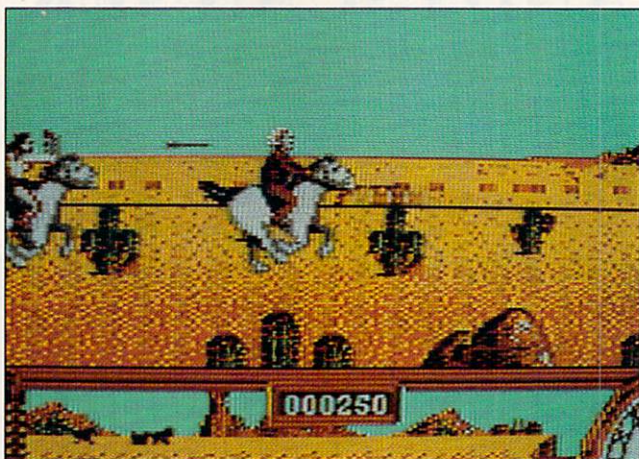
Back to the Future Part III is based on key scenes from the movie of the same name. You don't have to have seen the movie to play, but the scenes and goals are much more meaningful if you have. In the movie, Marty McFly has to go back to 1885 where Doc has opted to live out the rest of his

days. Unfortunately, Marty has just discovered those days number only 3! So he's going to bring Doc back to the future.

Upon reaching 1885, Marty encounters Indians, a lovely schoolteacher, and bad guy Buford "Mad Dog" Tannen. Each of these encoun-

cially Doc's. You (Marty) start spinning pie tins Frisbee-style at the bad guys.

Level 4 is the final run for the money. You must make your way over the roof of a moving train to supply it with enough of Doc's magic logs to get it up to the 88 mph necessary to send the De-



Doc must dodge Indians and other obstacles if he is to rescue Clara from a runaway buckboard that's heading for a ravine.

ters plays a part in our good guys' efforts to reach 1885.

The program takes four of the key turning points of the film as the basis of the four playing levels. Level 1 depicts the episode where Doc rescues schoolteacher Clara Clayton from the runaway buckboard before it falls into the ravine. As Doc, you try to catch the racing buckboard while galloping across rugged terrain and avoiding tumbling debris, crossfire between Indians and cavalrymen, and bank robbers.

Level 2 takes place at the celebration of the building of the clock tower where you—this time as Marty—take your turn at a newfangled shooting gallery.

Level 3 takes place later at the celebration when the bad guys are acting up and spoiling everyone's fun, espe-

cially Doc's. You (Marty) start spinning pie tins Frisbee-style at the bad guys.

I really appreciate the program's faithfulness to the film and the ingenuity used to adapt the situations to playable circumstances. I also have to compliment the graphics and the feel of the program. The horse on Level 1 is well drawn and graceful as it gallops across the screen. As you approach ditches and fallen suitcases, the anticipation is not unlike that of jumping a live horse. I even felt myself rise from my seat and lean forward with each jump.

Considering that my experience with arcade games isn't extensive, I suppose that what's challenging to me isn't nearly so much an obstacle to an avid player. Perhaps, but then this program gets progressively harder. What I like best is that it's not

defeating. I always feel it's within my power to do better next time. Nothing is more frustrating than an arcade game that continually creams you, and a frustrating game is one no one wants to play for long.

One warning: Don't start this game in dim light. As copy protection, this program resorts to the trendy password printed in black on dark red paper. The print is hard to read if you have good vision and nearly invisible if you have any sort of eye trouble, particularly color blindness. There has to be a better way.

The manual is really good—probably the best combination of entertaining writing, background information, directions, and helpful hints I've seen with a program in a long time. The only thing I would add would be a listing of the maximum number of points you could accumulate at each level. This is because you can either concentrate on making a clean run (not losing a life), or you can try to make a clean run and rack up points. If you knew the maximum possible number of points, you'd know when to quit looking for point opportunities.

This brings up an interesting hitch we found. The manual tells you twice not to shoot the cavalry, but the game gives you points for doing so. I sense a subtlety here. The cavalry seems to act as a screen; the cavalrymen help to fight off the Indians and the bank robbers, giving you a little more room to maneuver. When you shoot them, you lose their help. On the other hand, I've been killed by as many cavalrymen as Indians, so. . .

Of all the arcade games I've played, Back to the Future Part III is probably the

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most fun. The pace is varied, not constantly and increasingly tense as some games are. Graphics and sound are excellent. It has humor, plot, and familiar characters. There's also something more. The game has an intangible personality of its own, something programs take on only when they're well crafted, tight, and uniformly good, which Back to the Future Part III is.

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GOOFOY'S RAILWAY EXPRESS AND DONALD'S ALPHABET CHASE

As a mom and computer fan, I've long been satisfied with the 64's contribution to my children's education. From Carmen Sandiego, World Geography, Scrabble, and products from Davidson Educational Software, Commodore, and Fisher-Price on down to the Children's Television Workshop's Sesame Street series, there's been something at every level to keep my kids' eyes, hands, and minds glued to the computer, painlessly absorbing new concepts while being challenged in play.

Always looking for quality programs, I check out particular points when browsing. Is it attractive to my children? Does it make good use of the computer's capabilities? The 64 can manage both good graphics and good sound; a program that ignores this is too limited and

risks losing its audience. A program the kids won't use is useless. Does the program teach something specific, or can it expand my children's world? If it bears the label educational, the program had better do one of these; otherwise, it's entertainment masquerading as something else.

good friends? I'm happy to say that these programs fulfill my other requirements, too.

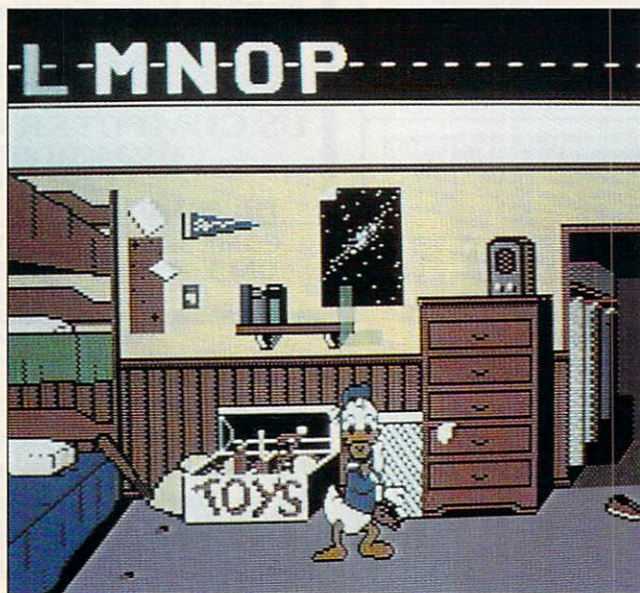
Geared for ages 2-5, these two games are an exploration of new worlds for preschoolers. In Goofy's Railway Express, Goofy and Mickey chug along the countryside in their train. Puffs of

time to change all the shapes on a screen. It takes several passes to catch all the shapes, thus holding the child's interest longer.

Goofy's graphics are excellently detailed, crisp, and entertaining. Sound effects are sprinkled throughout to good advantage. The interaction with the computer is kept simple—pressing the space bar—so that even the youngest child can handle this program in minutes. As children accompany Goofy and Mickey on their train ride, they learn how shapes make up the objects of our world.

Donald's Alphabet Chase allows children to play with the computer keyboard and experiment with recognizing letters. Donald's alphabet pets have escaped from his nephews' room and are running rampant throughout the house. He needs help catching them. When a child presses a letter, Donald goes to whatever room that letter is hiding in, waits until the letter leaves its hiding place, then picks it up and tosses it up to the top of the screen. When all the letters in a room are caught, the alphabet song plays.

The antics of these silly alphabet pets are delightful. Donald responds accordingly as they click the television on and off, stick their tongues out at him, and toss things out of the closet. There aren't a lot of sound effects, but the animation is terrific. In this game, the child is in control. Rather than asking the children to match the letters, Donald follows their directions and seeks out whatever letter they press. This allows them the freedom to explore the game and lets the parent guide children according to their abilities. Older children may be ready to



When a child presses a letter on the keyboard, Donald goes to his nephews' bedroom and other rooms to find the hiding letter.

As moms and dads the world over know, there are characters with universal appeal who have earned places in our children's Hearts of Fame. These friends include Bert and Ernie, Big Bird, Bugs Bunny, Mickey and Minnie Mouse, Goofy, and Donald Duck. Products associated with any of these characters have guaranteed attraction and appeal, but are they worthwhile on other counts?

Goofy's Railway Express and Donald's Alphabet Chase are two products from Disney Software that automatically fulfill the first requirement of child appeal. Who could resist Mickey's

smoke issue from the smokestack in all sorts of shapes. Children press the space bar to toot the whistle whenever they want to see a shape used to make a real object. In one sequence a triangle becomes a teepee; in another, it becomes a sailboat. These objects briefly become an animated part of the scenery.

Meanwhile, Goofy's train chugs on, passing through four different screens to his destination. There he reverses direction and heads back, the engine huffing and puffing more smoke shapes. Because the sequences take a little time and the train keeps moving, there isn't

locate a particular letter, while younger ones may select a letter and have Mom or Dad tell them what it is while Donald catches it.

Although these games are for the same age group, I found that, in our household, Goofy appealed more to 5-year-old Katie, who was ready to seek out the geometric shapes and the objects created from it, while Donald won over 3-year-old Michael, who laughed at the letters and sang along with the alphabet song. A lot depends on the child, naturally, but these programs work for the age group that Disney claims they will.

Disney recommends that you back up disks—an especially smart move for children's programs. There's no problem doing this since Disney's copy protection doesn't depend on the disk. Instead, at the beginning of each program you're asked to match and identify a graphic with one that appears on a sheet that accompanies the program.

Herein lies my sole complaint about these programs. Disney has printed this sheet with black ink on very dark reddish brown paper. Text is hard to read, and the graphics are difficult to see. The only reason I can see for making this so dark is so that it cannot be photocopied. My guess is borne out by the fact that Disney charges \$15 to replace a lost sheet. It will replace a damaged one free of charge, provided you send the pieces. While I hold no truck with pirating, making the sheet almost unreadable isn't the answer.

The process of creating and developing characters of the magnitude of Mickey Mouse and his companions carries a certain amount of responsibility. Any products that use these images should be closely scrutinized before they're placed on the market. Such products should be of high quality so as not to betray the trust of these characters' loyal following. As a rule, Disney is careful to meet this responsibility. It didn't let us down this time either.

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PROGRAMMER'S PAGE

Randy Thompson

SCREEN DAZZLERS

Here are some reader tips that show off your computer's versatile graphics hardware.

Two-Tall Text

This program creates letters that are 16 pixels tall—twice their normal height—by redefining the 64's reverse character set. Using this program, you can display a double-size letter by vertically stacking two reverse characters. Normal (unshifted) reverse characters comprise the upper half of the tall character set, while uppercase (shifted) reverse characters comprise the bottom half.

After typing in and running the following listing, you create an extra-tall message by pressing Ctrl-9, entering your message, moving the cursor below the message with the cursor keys, pressing the Shift Lock key, and then retyping your message.

The elongated character set used by this program resides in the upper part of computer memory normally reserved for BASIC programs. Because of this, large BASIC programs may overwrite the two-tall custom character set. To avoid such a conflict, enter the BASIC commands POKE 43,1: POKE 44,64: POKE 16384,0: NEW before you load your next BASIC program into memory.

```
AF 1000 POKE 56334,PEEK(
56334) AND 254:P
OKE 1,PEEK(1) AN
D 251
XP 1010 FOR I=0 TO 2047:
POKE 14336+I,PEE
K(53248+I):NEXT
{SPACE}I
PD 1020 POKE 1,PEEK(1) O
R 4:POKE 56334,P
EEK(56334) OR 1
RG 1030 O=14336:R=O+1024
:S=R+512
GJ 1040 FOR I=0 TO 63
JC 1050 M=O+(I*8)
GS 1060 FOR J=0 TO 7
```

```
JR 1070 POKE R+(I*8)+J,P
EEK(M):M=M+.5
HS 1080 NEXT J
AD 1090 FOR K=0 TO 7
FP 1100 POKE S+(I*8)+K,P
EEK(M):M=M+.5
DX 1110 NEXT K,I
MF 1120 POKE 53272,(PEEK
(53272) AND 240)
OR 14
```

GLENN ALTEMOSE JR.
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Chaotic Triangles

Here's a 128 program that was inspired by the science of chaos—the study of random, or chaotic, events and their relationships. Basically, this program demonstrates that there can be an amazing degree of order in randomness. If you're skeptical about this apparent contradiction, run the following program and see for yourself.

```
JX 100 COLOR0,1:COLOR 4,
1:COLOR1,2
CA 110 GRAPHIC 1,1
DH 120 MX=319:MY=199
QD 130 X(1)=0:X(2)=MX:X(
3)=MX/2
PP 140 Y(1)=0:Y(2)=0:Y(3
)=MY
ME 150 PX=MX*RND(1)
RG 160 PY=MY*RND(1)
AH 170 DO
RR 180 P=INT(RND(1)*3+1)
HH 190 PX=(PX+X(P))/2
FE 200 PY=(PY+Y(P))/2
BQ 210 DRAW ,PX,199-PY
XQ 220 LOOP
```

As the program plots points, it reveals the image of a triangle surrounded by three smaller triangles, each surrounded by three more triangles, and so on to infinity. This concept is no gimmick; it's a real scientific phenomenon. While the theory behind it is complicated, you may never think of randomness the same way again.

HENNING VAHLENKAMP
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Bouncing Balls

Run this program to spawn eight sprite-based balls that

fly across a black screen. They'll continue to bounce while you run a BASIC program, type in code, or enter commands at the computer's READY prompt.

```
BM 10 FOR I=0 TO 219:READ
D:C=C+D:POKE 8181
+I,D:NEXT
HH 60 IF C<>21956 THEN P
RINT "ERROR IN DAT
A STATEMENTS":STOP
DX 70 SYS 8181
CA 80 DATA 169,0,141,32,
208,141,33,208,76,
64,32,0,0,0,0
DS 90 DATA 0,0,0,0,0,0,0,0,
0,0,0,0,0,56,0,0
BQ 100 DATA 70,0,1,31,0,
1,63,0,3,127,128,
1,127,0,1
HX 110 DATA 255,0,0,254,
0,0,56,0,0,0,0,0,
0,0,0
PX 120 DATA 0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0
KK 130 DATA 169,255,141,
21,208,169,128,14
1,248,7,238,72,32
,174,72
KX 140 DATA 32,224,0,208
,243,169,1,141,39
,208,238,85,32,23
8,87
QJ 150 DATA 32,174,85,32
,224,9,208,238,12
0,169,115,141,20,
3,162
BP 160 DATA 32,142,21,3,
88,96,238,0,208,2
06,1,208,238,2,20
8
GG 170 DATA 238,2,208,23
8,3,208,238,4,208
,206,5,208,206,5,
208
JB 180 DATA 206,5,208,23
8,6,208,238,6,208
,238,6,208,238,7,
208
QE 190 DATA 238,8,208,23
8,8,208,238,9,208
,238,9,208,238,10
,208
HH 200 DATA 206,11,208,2
06,11,208,206,12,
208,206,12,208,20
6,12,208
RD 210 DATA 238,13,208,2
38,13,208,206,14,
208,206,14,208,20
6,15,208
JJ 220 DATA 206,15,208,2
06,15,208,76,49,2
34,0
```

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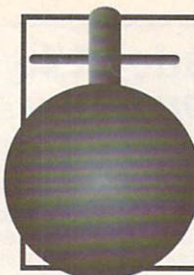
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Visible Sound Waves

This 64 program dynamically graphs the triangular waveform produced by the SID chip's Voice 3. To see Voice 3 in action, plug a joystick into port 2, and then type in and run the following listing.

```
AC 100 FOR I=679 TO 739:READ D
      :POKE I,D:C=C+D:NEXT
MP 110 IF C<>7677 THEN PRINT "
      ERROR IN DATA STATEMENT
      S":STOP
PD 120 DATA 162,0,160,0,169,50
      ,133,2,173,27,212,141,0
      ,208,173,18,208,141
FX 130 DATA 1,208,198,2,208,24
      0,173,0,220,201,126,208
      ,13,232,208,1,200,142
SH 140 DATA 14,212,140,15,212,
      76,171,2,201,125,208,21
      2,202,208,1,136,142,14
AC 150 DATA 212,140,15,212,76,
      171,2
SJ 160 PRINT CHR$(147):POKE 53
      280,0:POKE 53281,0
SJ 170 FOR I=54272 TO 54296:PO
      KE I,0:NEXT
RA 180 POKE 54296,15:POKE 5429
      1,190:POKE 54292,248:PO
      KE 54290,17
ES 190 FOR I=832 TO 894:POKE I
      ,255:NEXT
RA 200 POKE 2040,13:V=53248:PO
      KE V+21,1:POKE V+39,2:P
      OKE V,24:POKE V+1,100
XK 210 POKE 56333,127:SYS 679
```

Move the joystick up or down to change the pitch of the sound. For best visual results, tune the sound to a low pitch. When the frequency is low enough, you will see one large triangular waveform on your monitor screen. As you increase the frequency, the number of waveforms per screen increases. High-frequency tones oscillate faster than your monitor can handle, but they'll often lock into place like Lisajous patterns on an oscilloscope.

This program uses a single sprite to plot Voice 3's waveform. You might be interested to know that the machine language for the sprite-plotting code is only 15 bytes long.

```
LOOP LDA 54299
      STA 53248
      LDA 53266
      STA 53249
      JMP LOOP
```

RICHARD PENN
MONTREAL, PQ
CANADA

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BEGINNER BASIC

Larry Cotton

CHECK YOUR BANK'S MATH

Recently, I decided to run an amortization schedule on my 13-year-old home mortgage loan to see if it agreed with the bank's schedule. I wanted to see how each month's payment was apportioned to principal and interest. I also wanted to check the bank's math. Most importantly, I was interested in the balance due.

There's a certain satisfaction that comes from writing your own program while honing your BASIC skills. Let's write a simple program that does what we need. We'll start with white characters on a blue screen.

```
10 POKE53280,6:POKE646,1:
GOTO30
```

GOTO30 sends control around a subroutine in the next line, which appears early in the program to speed printing the screen. Here's the subroutine, which we'll discuss in a moment.

```
20 PRINTTAB(T1)N TAB(T2)J
TAB(T3)B:RETURN
```

Set C to 12 (more about that later) and define the tab stops to locate information in four columns on the screen. Remember that the leftmost screen position is TAB(0) and that positive numbers include a leading space.

```
30 C=12:T1=5:T2=16:T3=27
```

Rounding to dollars and cents requires two constants, 100 and .5.

```
40 H=100:D=.5
```

The next three lines gather user input and check for values less than zero. If any are found, the program just runs

from the beginning.

```
50 INPUT"(CLR){DOWN}AMOUNT
OF LOAN";B:IFB=<0THENRUN
60 INPUT"(DOWN)ANNUAL
INTEREST RATE";AI:I=AI/1200:
IFI=<0THENRUN
70 INPUT"(DOWN)NO. OF YEARS
ON LOAN";Y:M=Y*12:
IFM=<0THENRUN
```

B is the amount of the loan (later, balance). Line 60 also converts annual interest rate AI to its monthly decimal equivalent I; line 70 also converts years Y to months M.

Line 80 uses the above information plus rounding constants H and D to calculate the monthly payment. The formula uses a monthly payment schedule and won't work with any other payment interval.

```
80 P=(INT(H*B*(I+1)/((I+1)^M-
1))+D)/H
```

Line 90 prints the result of the calculation.

```
90 PRINT"(DOWN)MONTHLY
PAYMENT SHOULD BE $";P
```

If you're evaluating an existing loan and this isn't your actual payment, you have an opportunity to change it.

```
100 PRINT"(DOWN)(PRESS
RETURN TO USE ABOVE PAY
MENT)"
110 INPUT"(DOWN)ACTUAL
PAYMENT";AP$:IFAP$=""
THEN130
120 P=VAL(AP$)
```

Offer the option of seeing a monthly or yearly picture.

```
130 PRINT"(DOWN)SEE MONTHLY
OR YEARLY (M/Y)?"
140 GETA$:IFA$<>"Y" THEN
IFA$<>"M"THEN140
```

Here's the heading of the screen-printing routine, which uses the tab stops defined in line 30.

```
150 PRINT"(CLR)"
160 PRINT"(HOLD SPACE BAR TO
SEE ENTRIES)"
170 PRINT"(DOWN) MO."
TAB(T1)" PRINCIPAL"
TAB(T2)"
INTEREST"TAB(T3)" BAL
ANCE"
180 PRINT"({1 SPACE}){38 -}"
```

Now we must calculate and print the monthly dollar amounts applied to interest and principal and the principal balance. For this we use a month counter, Q.

```
190 Q=Q+1
```

Just after starting the counter, we check to see if the space bar has been pressed, which causes the calculated values to be printed. (To examine a line, release the space bar.)

```
200 GETB$:IFB$<>"
({1 SPACE})"THEN200
```

The three calculations are as follows.

```
210 J=INT((I*B)*H+D)/H
220 N=INT((P-J)*H+D)/H
230 B=INT((B-N)*H+D)/H
```

Pay close attention now. J (the portion of payment applied to interest) is monthly interest times principal balance, N (the portion of payment applied to principal) is the payment less interest, and B (the new principal balance) is the old balance less the portion of payment applied to principal.

Quickly, check to see if the balance has become less than zero.

```
240 IFB<0THENEND
```

Now we check the response from line 140 to see if we want to print a monthly or yearly picture. If monthly, our subroutine at line 20 kicks in after every calculation to print

Write an
amortization
program
to see if your
figures
agree with the bank's
schedule.

month Q and the other variables N, J, and B. If yearly, the line 20 subroutine is used only once every 12 calculations.

```
250 IF A$="M" THEN
    GOSUB 20:GOTO 270
260 IF INT(Q/C)=Q/C THEN
    GOSUB 20
```

Line 260 shows an interesting way to count by any value C. (C is equal to 12 in this program, as defined in line 30.) Q/C will always result in a decimal value except when Q is evenly divisible by C. If the balance on the loan is still greater than 0, then we return control of the program to line 190.

270 GOTO 190

When the amortization schedule has finished printing, we print the headings again, but in reverse order.

```
280 PRINT "{1 SPACE}{38 -}"
290 PRINT "{DOWN} MO."
    TAB(T1) "PRINCIPAL" TAB
    (T2) "INTEREST" TAB(T3) "
    BALANCE"
```

To use the program, enter the amount of the loan after any down payment (don't use commas); the annual interest rate, such as 8.5 or 10; and the number of years the loan runs. The program usually will not work with illogical values supplied.

If the calculated payment is OK, just press Return at the next question. If not, enter another payment. A payment greater than that calculated will reduce the term of the loan and vice versa; the program will end when the loan balance is less than zero.

Pressing the space bar causes the values to be displayed on either a monthly or yearly basis. Release the space bar to halt the listing. ☐



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GOING WILD ABOUT FONTS

The first GEOS article I ever had published was about fonts. That was a few years ago, and since so many things have changed in the GEOS world since those days, I thought I'd attack the subject again. After all, fonts are one of the more exciting aspects of using GEOS.

To see fonts in action, just boot up your copy of geoWrite. This word processor allows for just about any kind of expressive font you can imagine. When it comes to desktop publishing, there is even more excitement on hand. GeoPublish takes fonts a step further by introducing MegaFonts and allowing you to smooth and scale your fonts.

There are literally hundreds of fonts available from various sources. In addition to FontPack Plus and International FontPack from GeoWorks, font collections from Susan Lamb (3575 East County 18th Street, Yuma, Arizona 85365), and Jim Collette's collections (6782 Junction Road, Pavilion, New York 14525-9755), there are more public domain fonts around than you can count. Parsec (P.O. Box 111, Salem, Massachusetts 01970) has released a huge collection of public domain fonts along with an 80-page booklet giving examples of each one (\$24.95 plus \$2.90 shipping and handling U.S., \$7.50 Canada). The booklet and disks put more than 550 fonts at your fingertips.

One of the prerequisites for being able to use fonts effectively is knowing when to use them. Fonts can be separated into three categories, depending on how they're used. Those that look good in large bodies of text are called body fonts. These fonts are very

readable. They're a best bet for correspondence or as the text of a newsletter. Examples of body fonts are Roma, University, Wheeler, and Haste.

Headline fonts are more decorative and have much more character. They grab a reader's attention, but they seldom work well in large sections of text. Their frills can confuse the reader's eye. Fonts such as America, Kensington, and Telegraph are usually larger in size, which is in keeping with their function: creating headlines and other short sections of text. Headline fonts, carefully selected, can give your document extra impact.

The third type of font is the specialty font, including picture fonts like Ashby or Wurster. These fonts have limited value in geoWrite but make excellent miniphotocollections for geoPaint or geoPublish.

It's fun to collect fonts, but keeping them straight can be confusing. It can be especially frustrating if you're scanning lists of fonts by name, trying to recall what each one looks like. The easiest way to keep track of different fonts is to maintain printouts of each one. Such printouts or samples are included with commercial packages like FontPack Plus, but for the most part, you'll have to make your own. A utility by Joe Buckley called Font Dump will handle the job for you; you can download it from Q-Link. Its filename is FONT DUMP 3. SFX, uploaded by Red Storm.

If you need to check out a font on the fly, however, use FontView. This utility is from RUN magazine's GEOS Power Pack II disk (80 Elm Street, Peterborough, New Hampshire 03458). FontView displays any font you select from either drive and allows you to add style effects, such as italics and boldface.

Another clever way to organ-

ize fonts is to change the icon of each to the letter F from the actual font. A file of such icon images is available on Q-Link (FNTPK+ICONS, uploaded by LadyCarmen), which includes icons for most of the fonts on FontPack Plus. You'll need an icon editor, however, to make the switch.

Each font has an individual ID number, which applications use to identify the fonts in your documents. You can also identify fonts within a file or on a disk by these numbers using Identifont, a program written by Dennis Seitz of Berkeley, California.

If the font numbers it encounters correspond to known GEOS fonts (in other words, the ones on the system disks), it'll give you the font names; otherwise, it simply lists the font ID numbers. If you've kept a list of the numbers with your different printouts, you can cross-reference the various fonts yourself.

OK, you don't keep such good records. Neither do I. That's why I always appreciate a utility that takes care of those kinds of nagging little jobs for me. That's where Jim Collette's program called Font Editor 2.5 comes in.

Yes, it's a font editor, but it's easily the best of the bunch. It's loaded with every feature you could want. It'll create megafonts, allow you to scale fonts to different point sizes or widths, and even allow you to save a point size from one font into that size in another font.

To organize the whole mess, Font Editor will also print out the font along with the name, point size, and ID number. This handy program pretty much takes care of all the font needs any GEOS user could ask for. It's available from CommPlex Software for \$21.50. (See Collette's address above.) □

Fonts are one of the more exciting aspects of using GEOS.

PROGRAMS

MILK RUN

By Gus Vakalis

Milk Run is a fast-paced two-player arcade game with animated characters and a scrolling playing field. The object of the game is to deliver milk to the customers on your route. Getting the milk bottles right on the doorstep is tough enough, but you must also contend with angry dogs who chase you and an opponent who tosses milk bottles at you.

Typing It In

Although Milk Run is written entirely in machine language, it loads and runs like a BASIC program. To type it in, use MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: 0801

Ending address: 1F98

Be sure to save the program to disk before you exit MLX.

Deliver the Milk

After you load and run the program, you'll be taken immediately to the title screen. From there, press the space bar to start the game.

Player 1, using joystick 1, delivers milk to the houses on the left-hand side of the road, and player 2 uses joystick 2 to deliver to the houses on the right-hand side. You must deliver milk to each house with a white porch as it comes scrolling past.

Press the fire button to launch a milk bottle in the direction that the joystick points. Try to toss the bottles to land right at the white door. Failing to do so will cost you that customer, and that porch will turn red. A counter at the top of the screen indicates how many customers each player has remaining. You'll earn 100 points for each successful delivery, and those customers will continue their patronage for another round.

Occupational Hazards

Just doing your job is not enough to win this game. You also have to worry about the competition. You and your opponent can toss milk bottles in any direction, even at each other. If you're

struck by your opponent's milk bottle, you'll lose 500 points. Dogs are another nuisance. If you're bitten by a dog, you'll lose 1000 points.

You can stop your opponent's milk bottle or a charging dog by throwing your milk bottles at them. Since you can have only one bottle in the air at a time, however, saving yourself from these threats can cost you one or more customers.

There are five levels to the game, with each level having as many dog attacks as the level number. That is, there will be one dog attack at level 1, two at level 2, and so on.

Top Employee

At the end of the fifth level or at the end of any level in which a player has lost all of his customers, an Employee of the Month board will appear, praising the winner. The winner will be the player with the highest score and not the player with the most remaining customers. So it's possible to lose all of your customers and still win the game.

Key Keys

At the bottom of the screen, you'll find a red key bar indicating the keys that are active and their functions. Pressing the Q key at any time during the game will exit the game and return you to BASIC. Pressing Run/Stop will pause the game, and pressing it again will continue the action. The Restore key will terminate the game and reset it to the beginning so you can play again.

MILK RUN

```
0801:0B 08 0A 00 9E 32 30 36 2E
0809:31 00 00 00 78 A5 01 29 37
0811:FB 85 01 A2 00 BD 00 D8 9A
0819:9D 00 38 BD 00 D9 9D 00 7D
0821:39 BD 00 DA 9D 00 3A BD 0A
0829:00 DB 9D 00 3B BD 00 DC 91
0831:9D 00 3C BD 00 DD 9D 00 26
0839:3D BD 00 DE 9D 00 3E BD 6C
0841:00 DF 9D 00 3F E8 D0 CD 0A
0849:A5 01 09 04 85 01 AD 14 6D
0851:03 8D 8F 10 AD 15 03 8D 8E
0859:90 10 AD 18 03 8D 91 10 6E
0861:AD 19 03 8D 92 10 AD 28 20
0869:03 8D 93 10 AD 29 03 8D 77
0871:94 10 A9 FF 8D 8A 10 A9 65
0879:06 8D 8B 10 8D 06 14 A9 B8
0881:3C 8D 05 14 A9 01 8D 96 F7
0889:0F 8D D1 0F A9 D2 8D 14 77
0891:03 A9 0F 8D 15 03 A9 FA 4B
0899:8D 28 03 A9 F6 8D 29 03 B8
08A1:A9 EC 8D 18 03 A9 14 8D 69
```

```
08A9:19 03 A9 00 8D 8C 10 8D 88
08B1:8D 10 8D F4 14 8D 8E 10 91
08B9:8D 95 0F 8D D0 0F 58 A2 C6
08C1:00 BD 18 1D 9D 80 35 BD 2D
08C9:B8 1D 9D 20 36 BD 58 1E AA
08D1:9D C0 36 BD F8 1E 9D 60 5F
08D9:37 E8 E0 A0 D0 E3 A2 00 41
08E1:BD 18 1B 9D D8 3A E8 E0 76
08E9:C8 D0 F5 A2 00 BD E8 19 5D
08F1:9D D8 38 E8 E0 10 D0 F5 7B
08F9:A2 00 BD F8 19 9D 80 39 1C
0901:E8 E0 50 D0 F5 A2 00 BD CE
0909:48 1A 9D 08 3A E8 E0 D0 02
0911:D0 F5 A2 00 BD E0 1B 9D A2
0919:C0 3B E8 E0 C8 D0 F5 A2 9D
0921:00 BD C0 1C 9D 08 3E E8 EE
0929:E0 08 D0 F5 A2 00 BD C8 80
0931:1C 9D 28 3E E8 E0 08 D0 4D
0939:F5 A2 00 BD D0 1C 9D 48 45
0941:3E E8 E0 08 D0 F5 A2 00 EC
0949:BD D8 1C 9D 70 3E E8 E0 FC
0951:40 D0 F5 A9 FF 8D 6B 3D 5B
0959:8D 79 3D A9 81 8D 6C 3D 2B
0961:AD 18 D0 29 F0 09 0E 8D 52
0969:18 D0 A9 FF 8D 8A 10 20 C7
0971:49 0F 20 5A 0F 20 39 0F 10
0979:A9 00 8D 09 14 8D F4 14 77
0981:8D 46 14 8D 47 14 8D 54 41
0989:11 8D C1 12 8D 03 14 8D 0F
0991:04 14 8D 8C 10 8D 8D 10 07
0999:A9 40 8D A9 0E 8D AA 0E E6
09A1:A9 31 8D 9C 0A 8D 68 18 BF
09A9:A9 01 8D 07 14 8D 08 14 ED
09B1:A9 00 AA 9D 28 13 E8 E0 08
09B9:06 D0 F8 A9 80 8D 91 02 1C
09C1:A9 93 20 D2 FF A9 06 8D FE
09C9:20 D0 A9 00 8D 21 D0 A9 91
09D1:C8 8D E2 0D A9 04 8D E3 35
09D9:0D A9 00 8D E4 0D 8D E6 13
09E1:0D A9 00 8D B7 0D A9 0E 11
09E9:8D E5 0D 20 59 0D 20 7C 97
09F1:0E 20 AC 0E 20 18 0C A9 AC
09F9:00 8D 8A 10 A2 8C A0 FF 4A
0A01:88 D0 FD CA D0 F8 20 39 DD
0A09:0D 20 B8 0D AD B7 0D C9 C3
0A11:F0 D0 03 4C 30 0A CE E3 22
0A19:0D AD E3 0D 03 2E E7 27
0A21:0D CE E5 0D AD E5 0D D0 EC
0A29:D3 20 15 0E 4C FD 09 A9 C8
0A31:10 8D 6A 0A CE E5 0D AD 74
0A39:E5 0D D0 03 20 15 0E A2 E1
0A41:8F A0 FF 88 D0 FD CA D0 B2
0A49:F8 20 39 0D CE 6A 0A F0 FE
0A51:15 CE E5 0D AD E5 0D D0 21
0A59:E6 AD 6A 0A C9 03 90 DF 95
0A61:20 15 0E 4C 40 0A 4C 6B 7F
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0A71:FD CA D0 F8 AD A9 0E F0 02
0A79:23 AD AA 0E F0 1E EE 9C 3B
0A81:0A AD 9C 0A C9 36 F0 14 57
0A89:8D 68 18 29 0F 8D 07 14 E4
0A91:8D 08 14 A9 00 8D 09 14 E7
0A99:4C D0 09 00 A9 FF 8D 8A 1C
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0AA9:08 20 F0 FF A2 00 BD B1 2A
0AB1:15 20 D2 FF E8 E0 E3 D0 16
0AB9:F5 A0 00 B9 28 13 D9 2B F8
0AC1:13 F0 04 B0 0A 90 0B C8 98
0AC9:C0 03 D0 EF 4C D6 0A 4C 36
0AD1:49 0B 4C 82 0B A0 00 B9 93
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PROGRAMS

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0AF9:0B 18 A2 07 A0 08 20 F0 B4
0B01:FF A2 00 BD 5E 17 20 D2 FD
0B09:FF E8 E0 47 D0 F5 A0 00 89
0B11:A2 00 B9 28 13 4A 4A D2
0B19:4A 09 30 9D 4A 05 B9 28 78
0B21:13 29 0F 09 30 9D 4B 05 11
0B29:B9 2B 13 4A 4A 4A 09 07
0B31:30 9D 56 05 B9 2B 13 29 AB
0B39:0F 09 30 9D 57 05 E8 E8 82
0B41:C8 C0 03 D0 CD 4C B8 0B 75
0B49:18 A2 07 A0 08 20 F0 FF A1
0B51:A2 00 BD D6 16 20 D2 FF B4
0B59:E8 E0 44 D0 F5 A0 00 A2 86
0B61:00 B9 28 13 4A 4A 4A 76
0B69:09 30 9D 50 05 B9 28 13 3B
0B71:29 0F 09 30 9D 51 05 E8 29
0B79:E8 C8 C0 03 D0 E3 4C B8 E5
0B81:0B 18 A2 07 A0 08 20 F0 3E
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0B91:FF E8 E0 44 D0 F5 A0 00 E1
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0C39:F0 19 C9 3C D0 F6 20 B6 66
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0C79:29 18 20 D2 FF E8 E0 7D 40
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0DF9:A3 D8 A9 72 8D A3 04 B9 35
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0E11:EE E4 D0 60 A9 06 8D E5 EB
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0F09:D0 A9 94 8D 07 D0 A9 DB 10
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0F21:A9 81 8D 08 D0 A9 C8 8D F2
0F29:09 D0 8D 0B D0 A9 D9 8D D0
0F31:0A D0 A9 33 8D 15 D0 60 B3
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0F41:BE 19 E8 E0 28 D0 F5 60 01
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0FF1:F0 26 A9 00 8D 8D 10 A5 AF
0FF9:91 C9 7F D0 1B AD 8C 10 09
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1011:8D D0 0F A9 FF 8D 8D 10 0A
1019:AD 8C 10 F0 03 4C 31 EA DA
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1029:11 20 C3 12 20 48 14 CE 8C
1031:96 0F D0 03 20 6B 0F CE 46
1039:D1 0F D0 03 20 97 0F CE 9C
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1059:01 8D F9 07 AD FC 07 49 C5
1061:01 8D FC 07 AD FD 07 49 32
1069:01 8D FD 07 AD FA 07 C9 CE
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1079:07 4C 31 EA A9 D9 8D FA CF
1081:07 A9 D6 8D FB 07 4C 31 09
1089:EA 00 00 00 00 00 00 1F
1091:00 00 00 00 00 00 00 83
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10A9:AD 04 D0 C9 2C F0 41 60 60
10B1:EE 04 D0 AD 04 D0 C9 D4 0B
10B9:F0 08 AD C2 12 C9 02 F0 E2
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10C9:AD 04 D0 CD 06 D0 B0 01 8E
10D1:60 20 DF 11 4C F1 10 EE 70
10D9:05 D0 AD 05 D0 C9 C8 F0 E6
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10F9:F0 01 60 AD 01 DC 29 0F 96
1101:38 E9 0F 4A B0 09 4A B0 2F
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1111:01 8D 55 11 A9 78 8D 04 21
1119:D0 A9 94 8D 05 D0 4C 46 C3
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1129:8D 04 D0 A9 94 8D 05 D0 7D
1131:4C 46 11 A9 04 8D 55 11 D9
1139:A9 82 8D 04 D0 A9 94 8D A6
1141:05 D0 4C 46 11 AD 15 D0 42
1149:09 04 8D 15 D0 A9 FF 8D AE
1151:54 11 60 00 00 AD 2B 13 0E
1159:D0 0E AD 2C 13 29 F0 D0 CF
1161:07 AD 2C 13 C9 06 90 14 C4

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1169:F8	38	A0	02	B9	2B	13	F9	E4	1399:30	8D	BB	07	60	CE	05	14	7F	15C9:20	20	1D	1D	1D	1D	1D	1D	1D	36
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12E1:D0	F0	1C	AD	06	D0	C9	2E	3E	1511:1D	1D	1D	1D	1D	1D	1D	1D	3B	1741:1D	1D	90	20	20	20	20	20	3B	
12E9:D0	15	AD	2C	06	C9	73	D0	43	1519:1D	1D	1D	1D	1D	1D	20	20	4C	1749:20	20	20	20	05	30	30	30	0F	
12F1:0E	AC	E6	0D	B9	BE	19	09	F9	1521:20	20	20	C2	D9	20	C7	D5	48	1751:30	30	20	20	20	20	20	20	8B	
12F9:0F	99	BE	19	20	16	13	20	15	1529:D3	20	D6	C1	CB	C1	CC	C9	05	1759:20	20	20	20	13	9F	20	D0	CD	
1301:31	13	60	F8	18	A0	02	B9	21	1531:D3	20	20	20	20	20	1D	1D	2C	1761:CC	C1	D9	C5	D2	20	CF	CE	83	
1309:28	13	79	2E	13	99	28	13	7C	1539:1D	1D	1D	1D	1D	1D	1D	1D	63	1769:C5	20	20	9C	D0	CC	C1	D9	67	
1311:88	10	F4	D8	06	F8	18	A0	63	1541:1D	1D	1D	1D	1D	1D	20	20	74	1771:C5	D2	20	D4	7F	CF	20	1D	E3	
1319:02	B9	2B	13	79	2E	13	99	89	1549:20	20	20	20	20	20	20	20	73	1779:1D	1D	1D	1D	1D	1D	1D	1D	A7	
1321:2B	13	88	10	F4	D8	60	00	7F	1551:20	20	20	20	20	20	20	20	7B	1781:1D	1D	1D	1D	1D	1D	1D	90	23	
1329:00	00	00	00	00	00	01	00	51	1559:20	20	20	20	20	20	1D	1D	7A	1789:20	20	20	05	30	30	30	30	F6	
1331:AD	28	13	29	0F	09	30	8D	B7	1561:1D	1D	1D	1D	1D	1D	1D	1D	8B	1791:30	90	20	20	20	20	20	20	E3	
1339:9B	07	AD	29	13	4A	4A	4A	D7	1569:1D	1D	1D	1D	1D	1D	20	20	9C	1799:20	05	30	30	30	30	30	20	E4	
1341:4A	09	30	8D	9C	07	AD	29	33	1571:1C	D0	D2	C5	D3	D3	20	D3	96	17A1:20	20	20	13	92	1F	20	20	8E	
1349:13	29	0F	09	30	8D	9D	07	AF	1579:D0	C1	C3	C5	20	D4	CF	20	65	17A9:C3	CF	D0	D9	D2	C9	C7	C8	7B	
1351:AD	2A	13	4A																								

PROGRAMS

```

17F9:1D 1D 1D 1D 1D 1D 1D 1D 28
1801:1D 1D 1D 1D 1D 1D 1D 1D 31
1809:BA BB 20 BD 20 BF 12 40 C9
1811:92 20 12 43 44 92 20 20 D5
1819:20 20 12 47 48 92 20 12 F6
1821:4B 4C 92 20 12 4F 50 92 5F
1829:9F D0 CC C1 D9 C5 D2 20 BE
1831:CF CE C5 20 20 20 20 99
1839:20 20 05 CC C5 D6 C5 CC D0
1841:20 20 20 20 20 20 9C D0 1B
1849:CC C1 D9 C5 D2 20 D4 D7 80
1851:CF 20 20 20 20 05 30 30 1D
1859:30 30 30 20 20 20 20 97
1861:20 20 20 20 20 20 31 A2
1869:20 20 20 20 20 20 20 99
1871:20 20 30 30 30 30 30 85
1879:20 20 20 1C 12 20 20 D1 AA
1881:2D D1 D5 C9 D4 20 20 D2 4E
1889:D5 CE 2F D3 D4 CF D0 2D 30
1891:D0 C1 D5 D3 C5 20 20 D2 54
1899:C5 D3 D4 CF D2 C5 2D D2 14
18A1:C5 D3 C5 D4 13 A0 A0 AC
18A9:A0 A0 A0 A0 A0 6F A0 70 E4
18B1:20 20 20 20 20 20 20 71 33
18B9:A0 A0 70 20 20 20 20 54
18C1:20 20 71 A0 6F A0 A0 A0 22
18C9:A0 A0 A0 A0 A0 A0 5B 5C 2B
18D1:5D A0 A0 A0 A0 6F A0 70 6B
18D9:20 20 20 20 20 20 20 71 5B
18E1:A0 A0 70 20 20 20 20 7C
18E9:20 20 71 A0 6F A0 A0 A0 4A
18F1:A0 5E 5F 60 A0 A0 61 62 A8
18F9:63 6D 6D 6D 6D 6F A0 70 96
1901:20 20 20 20 20 20 20 71 84
1909:A0 A0 70 20 20 20 20 20 A5
1911:20 20 71 A0 6F 6E 6E 6E 14
1919:6E 64 65 66 A0 A0 67 68 6D
1921:69 A0 A0 A0 A0 6F A0 70 C2
1929:20 20 20 20 20 20 20 71 AC
1931:A0 A0 70 20 20 20 20 20 CD
1939:20 20 71 A0 6F A0 A0 A0 9B
1941:A0 6A 6B 6C A0 A0 A0 FB
1949:A0 A0 A0 A0 A0 6F A0 70 86
1951:20 20 20 20 20 20 20 71 D4
1959:A0 A0 70 20 20 20 20 20 F5
1961:20 20 71 A0 6F A0 A0 A0 C3
1969:A0 A0 A0 A0 A0 A0 A0 9B
1971:A0 A0 A0 A0 A0 6F A0 70 AE
1979:20 20 20 20 20 20 20 71 FC
1981:A0 A0 70 20 20 20 20 20 1E
1989:20 20 71 A0 6F A0 A0 A0 EB
1991:A0 A0 A0 A0 A0 A0 F0 F0 F5
1999:F0 F0 F0 F0 F0 F0 F0 CB
19A1:F0 F0 F0 F0 F0 F0 F0 D3
19A9:F0 F0 F0 F0 F0 F0 F0 DB
19B1:F0 F0 F0 F0 F0 F0 F0 E3
19B9:F0 F0 F0 F0 F0 F0 F0 EB
19C1:F0 F0 F0 F0 F0 F0 F0 F3
19C9:F0 F0 F0 F0 F0 F0 F0 FB
19D1:F0 F0 F0 F0 F0 F0 F0 04
19D9:F0 F0 F0 F0 F0 F0 F0 0C
19E1:F0 F0 F0 F0 F0 55 55 00 7D
19E9:00 00 00 00 00 FF FF 1C
19F1:FF 00 00 00 00 00 00 24
19F9:3C 66 6E 76 66 3C 00 00 3D
1A01:18 38 18 18 18 7E 00 00 8E
1A09:3C 66 0C 30 60 7E 00 00 76
1A11:3C 66 1C 06 66 3C 00 00 05
1A19:1C 3C 6C 7E 0C 0C 00 00 70
1A21:7E 60 7C 06 66 3C 00 00 C0
1A29:3C 60 7C 66 66 3C 00 00 AD
1A31:7E 66 0C 18 18 18 00 00 62
1A39:3C 66 3C 66 66 3C 00 00 37
1A41:3C 66 3E 06 66 3C 00 00 79
1A49:00 3C 66 7E 66 66 00 00 0E
1A51:00 7C 66 7C 66 7C 00 00 5E
1A59:00 3C 66 60 66 3C 00 00 93
1A61:00 78 6C 66 6C 78 00 00 EC
1A69:00 7E 60 78 60 7E 00 00 CD
1A71:00 7E 60 78 60 60 00 00 5D
1A79:00 3C 60 6E 66 3C 00 00 D3
1A81:00 66 66 7E 66 66 00 00 D0
1A89:00 3C 18 18 18 3C 00 00 03
1A91:00 1E 0C 0C 6C 38 00 00 D3
1A99:00 66 6C 78 6C 66 00 00 79
1AA1:00 60 60 60 60 7E 00 00 FC
1AA9:00 63 77 7F 6B 63 00 00 86
1AB1:00 66 76 7E 6E 66 00 00 43
1AB9:00 3C 66 66 66 3C 00 00 54
1AC1:00 7C 66 66 7C 60 00 00 AD
1AC9:00 3C 66 66 6E 3C 06 00 B0
1AD1:00 7C 66 66 7C 66 00 00 D5
1AD9:00 3E 60 3C 06 7C 00 00 8F
1AE1:00 7E 18 18 18 18 00 00 5B
1AE9:00 66 66 66 66 3C 00 00 0F
1AF1:00 66 66 66 3C 18 00 00 35
1AF9:00 63 6B 7F 77 63 00 00 B5
1B01:00 66 3C 18 3C 66 00 00 55
1B09:00 66 66 3C 18 18 00 00 8A
1B11:00 7E 0C 18 30 7E 00 00 65
1B19:3F 5E 6E 77 7B 7D 4E 00 3A
1B21:FE 3D BB 77 EF DF B9 00 87
1B29:00 00 F0 F8 F8 F8 00 00 B8
1B31:00 00 0F 1F 1F 1F 00 00 B0
1B39:7F BC DD EE F7 FB 9D 00 F3
1B41:FC 7A 76 EE DE BE 72 57 80
1B49:57 4F 7F 7F 4F 57 57 75 E2
1B51:75 79 7F 7F 79 75 75 7C 91
1B59:7C 7C 7E 7E 7C 7C 7C 3E B1
1B61:3E 3E 7E 7E 3E 3E 3E AE 14
1B69:AE 9E FE FE 9E AE AE EA 66
1B71:EA F2 FE FE F2 EA EA 4E 11
1B79:7D 7B 77 6E 5E 3F 00 B9 CC
1B81:DF EF 77 BB 3D FE 00 00 34
1B89:F8 F8 F8 F0 00 00 00 A8
1B91:1F 1F 1F 0F 00 00 00 9D 91
1B99:FB F7 EE DD BC 7F 00 72 DD
1BA1:BE DE EE 76 7A FC 00 00 FB
1BA9:E0 E6 06 60 6E 0E 00 00 7C
1BB1:07 67 60 06 76 70 00 00 27
1BB9:7E 7E 7E 7E 7E 7E 60 D1
1BC1:60 60 60 60 60 60 60 9D
1BC9:06 06 06 06 06 06 06 7C 76
1BD1:7C 7C 7E 7E 7C 7C 7C 3E 2A
1BD9:3E 3E 7E 7E 3E 3E 3E F8 D6
1BE1:FC 7E 7F 7F 7B 79 78 1F EF
1BE9:3F 7E FE FE DE 9E 1E 78 55
1BF1:78 78 F8 F8 00 00 00 1E 4F
1BF9:1E 1E 1F 1F 00 00 00 7E 1B
1C01:7E 3C 3C 3C 3C 3C 3C 5A
1C09:3C 3C 7E 7E 00 00 00 7E A4
1C11:7E 3C 3C 3C 3C 3C 3C 6A
1C19:3C 3F 7F 7F 00 00 00 00 27
1C21:1C FC FC FC 00 00 00 F8 0F
1C29:F8 79 7B 7F 7F 7F 7C 19
1C31:FC F0 E0 C0 80 80 C0 7B 4F
1C39:79 78 F8 F8 00 00 00 E0 DB
1C41:F0 F8 7C 7C 00 00 00 FF 87
1C49:FF 78 78 78 7F 7F F8 EF
1C51:FC 1E 0E 0E 1E FC F8 78 81
1C59:78 78 F8 F8 00 00 00 78 13
1C61:3C 1E 0F 0F 00 00 00 7C 8E
1C69:7C 3C 3C 3C 3C 3C 3C C3
1C71:3E 3C 3C 3C 3C 3C 3C AA
1C79:3C 3F 3F 1F 00 00 00 3C B5
1C81:3C FC FC F8 00 00 00 F8 3F
1C89:F8 7C 7E 7F 7F 7F 7B 3E 54
1C91:3E 3C 3C 3C BC FC FC 79 90
1C99:78 78 F8 F8 00 00 00 FC D7
1CA1:FC 7C 3E 3E 00 00 00 FF 23
1CA9:FF FF FF FF FF FF FF FF E1
1CB1:FF FF 81 FF FF FF FF FF 1A
1CB9:F9 F3 E7 CF 9F 3F FF FF DF
1CC1:FF C3 99 81 99 99 FF FF 69
1CC9:FF 81 9F 87 9F 81 FF FF D1
1CD1:FF C3 E7 E7 E7 C3 FF FF C4
1CD9:FF 99 89 81 91 99 FF FF B4
1CE1:FF C3 99 99 99 C3 FF FF B3
1CE9:FF 83 99 99 83 9F FF FF 6A
1CF1:FF C3 99 99 91 C3 F9 FF 77
1CF9:FF 83 99 99 83 99 FF FF 62
1D01:FF C1 9F C3 F9 83 FF FF B9
1D09:FF 81 E7 E7 E7 E7 FF FF FD
1D11:FF 99 99 99 99 C3 FF 00 5A
1D19:00 00 00 00 00 00 00 53
1D21:00 00 00 00 00 00 00 5B
1D29:00 00 00 00 00 00 00 63
1D31:F4 00 00 FC 00 00 F4 00 9F
1D39:00 00 00 00 00 00 00 73
1D41:00 00 00 00 00 00 00 7B
1D49:00 00 00 00 00 00 00 83
1D51:00 00 00 00 00 00 00 8B
1D59:00 00 00 00 00 00 00 93
1D61:00 00 00 00 00 00 00 9B
1D69:00 00 00 00 00 70 00 65
1D71:70 00 00 70 00 20 00 2B
1D79:00 70 00 00 00 00 00 CF
1D81:00 00 00 00 00 00 00 BB
1D89:00 00 00 00 00 00 00 C3
1D91:00 00 00 00 00 00 00 CB
1D99:00 00 00 00 00 00 00 D3
1DA1:00 00 00 00 00 00 00 DB
1DA9:00 00 00 00 00 00 00 01 E4
1DB1:78 00 01 F8 00 01 78 00 CC
1DB9:00 00 00 00 00 00 00 F3
1DC1:00 00 00 00 00 00 00 FB
1DC9:00 00 00 00 00 00 00 04
1DD1:00 00 00 00 00 00 00 0C
1DD9:00 00 00 00 00 00 00 14
1DE1:00 00 00 00 00 00 00 1C
1DE9:00 00 00 00 00 70 00 00 E5
1DF1:20 00 00 70 00 70 00 24
1DF9:00 70 00 00 00 00 00 50
1E01:00 00 00 00 00 00 00 3D
1E09:00 00 00 00 00 00 00 45
1E11:00 00 00 00 00 00 00 4D
1E19:00 00 00 00 00 00 00 55
1E21:00 20 00 00 A8 00 00 98 43
1E29:00 00 20 00 00 20 00 02 EB
1E31:9A 00 00 A4 00 00 A8 00 56
1E39:00 68 00 00 A8 00 00 20 F4
1E41:00 02 22 00 00 00 00 42
1E49:00 00 00 00 00 00 00 85
1E51:00 00 00 00 00 00 00 8D
1E59:00 00 00 00 00 00 00 95
1E61:00 20 00 00 A8 00 00 98 83
1E69:00 02 22 00 00 20 00 00 EA
1E71:98 00 00 A4 00 00 A8 00 95
1E79:02 6A 00 00 A8 00 00 20 B6
1E81:00 00 20 00 00 00 00 00 C1

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1E89:00 00 00 00 00 00 00 00 C5
1E91:00 00 00 00 00 00 00 00 CD
1E99:28 00 00 AA 00 00 69 00 67
1EA1:00 14 00 00 FC 40 03 FF D1
1EA9:C0 0F 3F 00 04 3C 00 00 03
1EB1:38 00 15 EC 00 17 FC 00 D1
1EB9:03 0C 00 00 CC 00 02 8C 71
1EC1:00 00 08 00 00 0A 00 00 27
1EC9:00 00 00 00 00 00 00 00 06
1ED1:00 00 00 00 00 00 00 00 0E
1ED9:28 00 00 AA 00 00 69 00 A7
1EE1:00 14 40 00 3F C0 00 FF 28
1EE9:00 03 FC 00 0F 3C 00 04 F3
1EF1:38 00 00 2F 00 15 3F C0 D0
1EF9:15 30 C0 00 33 00 00 32 B0
1F01:80 00 20 00 00 A0 00 00 06
1F09:00 00 00 00 00 00 00 00 47
1F11:00 00 00 00 00 00 00 00 4F
1F19:28 00 00 AA 00 00 69 00 E8
1F21:00 14 00 01 3F 00 03 FF 74
1F29:C0 00 FC F0 00 3C 10 00 87
1F31:2C 00 00 3B 54 00 3F D4 2F
1F39:00 30 C0 00 33 00 00 32 67
1F41:80 00 20 00 00 A0 00 00 46
1F49:00 00 00 00 00 00 00 00 87
1F51:00 00 00 00 00 00 00 00 8F
1F59:28 00 00 AA 00 00 69 00 29
1F61:01 14 00 03 FC 00 00 FF 3D
1F69:00 00 3F C0 00 3C F0 00 6E
1F71:2C 10 00 F8 00 03 FC 54 B3
1F79:03 0C 54 00 CC 00 02 8C BD
1F81:00 00 08 00 00 0A 00 00 E8
1F89:00 00 00 00 00 00 00 00 C7
1F91:00 00 00 00 00 00 00 00 CF

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Gus Vakalis drinks his milk every day in Jamaica, New York.

TURBO POKER

By Mark Neri

Turbo Poker brings the classic game of poker into the computer age. No longer is poker a game of leisurely thought. Turbo Poker requires a fast hand on the joystick and an even faster mind to arrange a relentless storm of cards.

Turbo Poker is written entirely in machine language, but it loads and runs like a BASIC program. To type in Turbo Poker, use MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following.

Starting address: 0801

Ending address: 0E59

Be sure to save a copy of the program before you exit MLX.

When you are ready to play, type LOAD "TURBO POKER", 8 and press Return. When the cursor reappears, type RUN and press Return again. The Tur-

bo Poker screen will appear.

Playing the Game

Once the program has begun, select the level you want to play. To choose your level, use a joystick in port 2. Move the stick left and right to move the black level meter. When the needle is toward the left, the game is quite slow. As you move the needle to the right, the speed of the game increases. When the needle is on the far right, the game is extremely fast and quite difficult.

After you've selected a level, press the fire button to begin the game. A card will appear at the left side of the screen and begin to slide across to the right. When the card has gone about halfway across the screen, it will stop, and a new card will enter from the left. The object of the game is to form winning poker hands by guiding the cards with the joystick.

For those unfamiliar with poker, winning hands as well as their point values are shown below.

Two Pair. Two pairs of cards with matching numbers. 5 points.

Three of a Kind. Three cards of the same number. 10 points.

Straight. Five cards with consecutive numbers, of any suit. 20 points.

Flush. Five cards, all of the same suit. 30 points.

Full House. Two cards of one number and three of another number. 40 points.

Four of a Kind. Four cards of the same number. 50 points.

Straight Flush. Five cards with consecutive numbers, all of the same suit. 75 points.

Royal Flush. Ace, king, queen, jack, and 10, all of the same suit. 100 points.

In Turbo Poker, seven hands of five cards are formed vertically. A hand must contain five cards in order for it to be counted.

As cards slide across the screen, try to position them so that they'll form winning hands. If you try to put a card where there's already a card, the card that's already there will slide right, pushing along any cards that were there before. If any card ends up being pushed off the screen, the game is over. After each card is placed, any winning hands will be removed, and points will be awarded. The cards to their right will fill in the spaces that the removed cards leave. By forming hands and causing them to be removed, you can stop the cards from reaching the right edge of the screen and ending the game. Note that any of the seven columns is a hand, and a winning combination in any of them will be removed.

For each winning hand, your score will increase. The amount by which your score increases depends both on the hand you managed to form and the level you're playing. When you've removed a certain number of hands, your level will increase, and the cards will slide faster.

TURBO POKER

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0801:0B 08 C7 07 9E 32 30 36 56
0809:31 00 00 00 20 17 0C 20 47
0811:7F 0D A9 00 85 1C 85 1D 1E
0819:85 1E 85 1F 20 5F 0D 20 CE
0821:CC 0C A0 80 A9 FF 99 FF 37
0829:BF 88 D0 FA 20 67 0B A9 63
0831:00 85 06 85 09 85 0B 85 B5
0839:0A A5 1B 49 0F 85 1A E6 59
0841:1A 20 86 0C 20 85 0B 85 AA
0849:0E 29 0F 85 07 A5 0E 4A 1A
0851:4A 4A 4A 85 08 A5 02 85 1B
0859:04 A5 03 85 05 A5 0B F0 53
0861:05 C6 0B 4C A0 08 AE 00 4E
0869:DC 8A 29 01 D0 15 A5 06 EB
0871:F0 11 C6 06 A9 04 85 0B EA
0879:A5 02 38 E9 78 85 02 B0 11
0881:02 C6 03 8A 29 02 D0 17 57
0889:A5 06 C9 04 F0 11 E6 06 07
0891:A9 04 85 0B A5 02 18 69 A7
0899:78 85 02 90 02 E6 03 8A CC
08A1:29 08 D0 06 85 0A A9 01 6B
08A9:85 1A A5 0A F0 05 C6 0A 8B
08B1:4C C0 08 A5 1A 85 0A E6 55
08B9:09 E6 02 D0 02 E6 03 20 27
08C1:EB 0B 20 A2 0B 20 63 09 61
08C9:A5 09 C9 11 F0 03 4C 56 BB
08D1:08 20 F4 08 A4 1A 20 63 3E
08D9:09 88 D0 FA 20 F4 08 A4 E3
08E1:1A 20 63 09 88 D0 FA 20 A1
08E9:F4 08 20 37 09 20 6E 09 9C
08F1:4C 30 08 A5 02 85 16 A5 87
08F9:03 18 69 D4 85 17 A0 3D 13
0901:B1 02 C8 91 02 88 B1 16 4A
0909:C8 91 16 88 88 C0 FF D0 47

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PROGRAMS

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0911:EF A9 A0 A0 00 91 02 A0 8E
0919:28 91 02 A0 17 91 02 A0 91
0921:18 91 02 A9 05 A0 00 91 BA
0929:16 A0 28 91 16 A0 17 91 7F
0931:16 A0 18 91 16 60 A5 06 16
0939:0A 0A 0A 85 0C A9 C0 85 7A
0941:0D A0 06 B1 0C C9 FF F0 56
0949:05 68 68 4C 0A 0D A0 06 95
0951:B1 0C C8 91 0C 88 88 C0 C5
0959:FF D0 F5 A5 0E A0 00 91 3D
0961:0C 60 AD 11 D0 10 FB AD C4
0969:11 D0 30 FB 60 A9 00 85 2D
0971:0F A0 04 A9 00 85 10 99 1E
0979:3F C0 88 D0 FA A0 16 99 99
0981:43 C0 88 D0 FA A4 0F B9 C5
0989:00 C0 20 E9 09 B9 08 C0 6E
0991:20 E9 09 B9 10 C0 20 E9 98
0999:09 B9 18 C0 20 E9 09 B9 22
09A1:20 C0 20 E9 09 A5 10 D0 66
09A9:36 20 03 0A 20 1B 0A 20 81
09B1:40 0A A6 13 E0 00 F0 07 5C
09B9:20 2F 0D CA 4C B5 09 A5 E6
09C1:13 C9 00 F0 1A 20 BE 0A B7
09C9:E6 1F A5 1F C9 0C D0 0F EC
09D1:A5 1B C9 0F F0 09 E6 1B 3C
09D9:20 F8 0C A9 00 85 1F E6 91
09E1:0F A5 0F C9 08 D0 8A 60 5C
09E9:C9 FF F0 11 48 29 0F AA BF
09F1:FE 44 C0 68 4A 4A 4A 4A 8D
09F9:AA FE 40 C0 60 A9 01 85 66
0A01:10 60 A9 00 85 11 A0 04 20
0A09:B9 3F C0 C9 05 D0 07 A9 A1
0A11:01 85 11 4C 1A 0A 88 D0 C8
0A19:EF 60 A9 00 85 12 AA AD E9
0A21:50 C0 F0 01 E8 A0 0D B9 59
0A29:43 C0 F0 08 E8 E0 05 F0 73
0A31:09 4C 37 0A A2 00 88 D0 5B
0A39:EE 60 A9 01 85 12 60 A5 FC
0A41:11 F0 1D A5 12 F0 14 AD 42
0A49:52 C0 F0 0A AD 44 C0 D0 46
0A51:05 A9 64 4C AD 0A A9 4B D7
0A59:4C AD 0A A9 1E 4C AD 0A 62
0A61:A5 12 F0 05 A9 14 4C AD 1F
0A69:0A A9 04 20 B0 0A E0 01 DF
0A71:D0 05 A9 32 4C AD 0A A9 5E
0A79:03 20 B0 0A E0 01 D0 0E 88
0A81:A9 02 20 B0 0A E0 01 D0 A0
0A89:05 A9 28 4C AD 0A A9 03 40
0A91:20 B0 0A E0 01 D0 05 A9 30
0A99:0A 4C AD 0A A9 02 20 B0 62
0AA1:0A E0 02 D0 05 A9 05 4C 65
0AA9:AD 0A A9 00 85 13 60 A0 26
0AB1:0D A2 00 D9 43 C0 D0 01 52
0AB9:E8 88 D0 F7 60 A4 0F B9 6B
0AC1:00 C0 20 97 0B B9 08 C0 93
0AC9:20 97 0B B9 10 C0 20 97 2C
0AD1:0B B9 18 C0 20 97 0B B9 18
0AD9:20 C0 20 97 0B B9 01 C0 AD
0AE1:99 00 C0 B9 09 C0 99 08 FC
0AE9:C0 B9 11 C0 99 10 C0 B9 43
0AF1:19 C0 99 18 C0 B9 21 C0 67
0AF9:99 20 C0 C8 C0 08 D0 DD 2D
0B01:A9 FF 8D 06 C0 8D 0E C0 17
0B09:8D 16 C0 8D 1E C0 8D 26 91
0B11:C0 A9 05 85 0D 85 15 A9 3D
0B19:D9 85 17 85 19 A9 A6 85 FA
0B21:0C 85 16 A9 A3 85 14 85 DC
0B29:18 A2 0E A5 0F 0A 18 65 46
0B31:0F A8 B1 0C 91 14 B1 16 46
0B39:91 18 C8 C0 15 D0 F3 CA E1

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0B41:F0 21 A5 0C 18 69 28 85 C9
0B49:0C 85 16 90 04 E6 0D E6 4F
0B51:17 A5 14 18 69 28 85 14 6B
0B59:85 18 90 04 E6 15 E6 19 FC
0B61:4C 2C 0B C6 0F 60 A2 40 F5
0B69:A9 01 9D 83 C0 CA D0 FA 4E
0B71:A0 04 A9 00 99 8F C0 99 34
0B79:9F C0 99 AF C0 99 BF C0 6A
0B81:88 D0 F1 60 AD 1B D4 29 01
0B89:3F AA BD 84 C0 F0 F5 A9 49
0B91:00 9D 84 C0 8A 60 C9 FF 15
0B99:F0 06 AA A9 01 9D 84 C0 E1
0BA1:60 A5 02 85 16 A5 03 18 4F
0BA9:69 D4 85 17 A4 07 B9 DA 5B
0BB1:0B A0 00 91 02 A0 29 91 05
0BB9:02 A4 08 B9 E7 0B A0 28 6B
0BC1:91 02 A0 01 91 02 A5 08 2D
0BC9:29 02 A0 00 91 16 C8 91 11
0BD1:16 A0 28 91 16 C8 91 16 46
0BD9:60 32 33 34 35 36 37 38 7F
0BE1:39 14 0A 11 0B 01 41 58 23
0BE9:5A 53 A5 04 85 16 A5 05 CB
0BF1:18 69 D4 85 17 A9 A0 A0 A2
0BF9:00 91 04 C8 91 04 A0 28 87
0C01:91 04 C8 91 04 A0 05 A0 86
0C09:00 91 16 C8 91 16 A0 28 23
0C11:91 16 C8 91 16 60 A9 01 30
0C19:8D 21 D0 A9 06 8D 20 D0 6C
0C21:A2 04 A0 18 A9 85 14 31
0C29:85 16 A9 03 85 15 A9 D7 9A
0C31:85 17 A9 A0 91 14 A9 05 46
0C39:91 16 C8 D0 F5 CA F0 07 89
0C41:E6 15 E6 17 4C 33 0C A0 48
0C49:A0 B9 B9 0D 99 FF 03 A9 A4
0C51:06 99 FF D7 99 27 D8 A9 15
0C59:00 99 C7 D8 A9 20 99 C7 27
0C61:04 88 D0 E5 A0 05 B9 7B 1E
0C69:0C 99 FB 04 B9 80 C0 99 2F
0C71:0B 05 88 D0 F1 A9 30 8D 92
0C79:39 05 60 0C 05 16 05 0C D2
0C81:13 03 0F 12 05 AD 1B D4 D0
0C89:29 07 C9 05 B0 F7 85 06 F7
0C91:85 02 A9 00 85 03 06 02 68
0C99:06 02 06 02 A5 02 85 16 6C
0CA1:A5 03 85 17 06 02 06 02 B5
0CA9:06 02 26 03 06 02 26 03 C1
0CB1:A5 02 38 E5 16 85 02 A5 F2
0CB9:03 E9 00 85 03 A5 02 18 F0
0CC1:69 90 85 02 A5 03 69 05 94
0CC9:85 03 60 A0 00 AE 00 DC 13
0CD1:8A 29 04 D0 05 C0 00 F0 23
0CD9:01 88 8A 29 08 D0 05 C0 C6
0CE1:0F F0 01 C8 8A 29 10 D0 54
0CE9:03 84 1B 60 84 1B 20 F8 D7
0CF1:0C 20 63 09 4C CE 0C A2 6D
0CF9:10 A9 00 9D 1D 05 CA D0 D5
0D01:FA A4 1B A9 DD 99 1E 05 56
0D09:60 A0 09 B9 25 D0 99 D7 A0
0D11:04 88 D0 F7 AD 00 DC 29 39
0D19:10 D0 F9 AD 00 DC 29 10 5F
0D21:F0 F9 4C 0D 08 07 01 0D F7
0D29:05 20 F0 16 05 12 48 8A 9C
0D31:48 98 48 20 A4 0D A5 1B 60
0D39:18 69 01 C9 0A 90 03 18 27
0D41:69 06 F8 18 65 1C 85 1C F4
0D49:A5 1D 69 00 85 1D A5 1E B4
0D51:69 00 85 1E D8 20 5F 0D C5
0D59:68 A8 68 AA 68 60 A2 03 96
0D61:A0 00 B5 1B 48 4A 4A 4A 7E
0D69:4A 18 69 30 99 33 05 C8 4B

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0D71:68 29 0F 18 69 30 99 33 DF
0D79:05 C8 CA D0 E5 60 A9 FF B2
0D81:8D 0E D4 8D 0F D4 A9 80 F8
0D89:8D 12 D4 A9 8F 8D 18 D4 DB
0D91:A9 14 8D 00 D4 8D 01 D4 EA
0D99:A9 08 8D 05 D4 A9 00 8D 67
0DA1:06 D4 60 A9 10 8D 04 D4 2E
0DA9:20 63 09 A9 11 8D 04 D4 04
0DB1:A2 05 20 63 09 CA D0 FA A8
0DB9:60 A0 C3 F2 C9 D5 F2 C3 23
0DC1:C9 F0 C9 A0 D5 C9 A0 69 C0
0DC9:20 20 5F A0 69 20 20 5F 5D
0DD1:A0 20 A0 69 E9 A0 20 20 21
0DD9:20 20 A0 69 20 20 5F A0 97
0DE1:A0 A0 A0 C2 C2 C2 EB F2 A0
0DE9:CB EB F1 C9 C2 C2 A0 20 42
0DF1:A0 A0 20 A0 20 A0 A0 20 77
0DF9:A0 20 69 E9 A0 A0 20 E2 E2
0E01:E2 A0 A0 20 A0 A0 20 A0 35
0E09:A0 A0 A0 CB CA CB CB CA 56
0E11:C3 F1 C3 F1 F1 CB A0 20 43
0E19:20 20 E9 A0 20 A0 A0 20 79
0E21:A0 20 DF 5F A0 A0 20 62 B1
0E29:62 A0 A0 20 20 20 E9 A0 AA
0E31:A0 A0 A0 A0 A0 A0 A0 4D
0E39:A0 A0 A0 A0 A0 A0 A0 20 D4
0E41:A0 A0 A0 A0 DF 20 20 E9 9D
0E49:A0 20 A0 DF 5F A0 20 20 AD
0E51:20 20 A0 20 A0 DF 5F A0 7F
0E59:A0 20 00 00 00 00 00 00 CD

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Mark Neri is a card shark who lives in Longwood, Florida.

FILE LORD

By Daniel Lightner

There's no end to the data you can manage with this database program for the 64, and it's easy to create and access files with hundreds of records. With File Lord you can keep track of business contacts, birthdays, phone numbers, record collections, friends' addresses, and much more. Plus, File Lord allows you to specify the number of fields and their names in each record. You can also specify the length of each field.

Getting Started

File Lord is written entirely in machine language; enter it with MLX, our machine language entry program. See "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: 0801

Ending address: 19AF 14C8

After you've finished typing in the program, be sure to save a copy to disk under the name of File Lord.

Using the Program

File Lord is easy to use. You just load and run it as you would any BASIC program. When you first run the program, you must load a file or create a new one. To create a file, choose option 7 of the File Lord menu. Note that you must use the Shift key with all of the options below option 6. After you have selected an option, the computer prompts you to make sure. If the label displayed is correct, press the Y key; if not, press N.

Number of Fields

If you chose option 7, you'll be prompted for a filename. Enter the name you wish to call the file and press Return. Next, you'll be asked for the number of fields that you wish each record to contain. For example, if you want the file to contain addresses, you'd want to include people's names. So Name would be one field. You'd also want street addresses, so that's two. You'd also want the city, state, and ZIP code for each person. If you want each of these to be a separate field, it might look something like this.

Name	Field 1
Street	Field 2
City	Field 3
State	Field 4
ZIP code	Field 5

In this example there are five fields. So to answer the prompt, you would press the 5 key. File Lord allows up to nine fields.

In the example above, the Name field could've been replaced by three fields to record a person's first name, middle name, and last name. That would've left two fields remaining. We could then include a telephone number and perhaps a field for notes.

Field Names

When you've entered the number of fields you want, File Lord will ask you to name them. At the prompt, give the name for each field indicated.

Field Size

When you've finished naming the fields, File Lord will prompt you for the maximum number of characters you want for each field. File Lord will ac-

cept up to 18 characters for each field. If you don't need that many, however, don't enter that many. For example, in a field for telephone numbers, you would only need 3 for the area code, 1 for a dash, 3 more for the prefix, 1 for another dash, and then 4 for the final four digits. It might look like this: 409-555-1212. In this case, you would choose 12 characters. You can abbreviate the states with two-letter postal codes.

When you've finished entering the required data to set up a file, File Lord displays the information and asks if everything is correct. Press N if you wish to make changes in the format.

Write a Record

Now that you've created a file, let's write a record by selecting option 2. Notice that File Lord prompts you with your field names. You simply enter the required information at the prompt. If you don't know all the correct data, simply enter something fictitious; it can easily be deleted later.

Read a Record

Select option 1 to read a record. File Lord tells you how many records you have and asks for a number to read. Enter a record number to read it. If several files are available, you can scroll through them by selecting option 4.

If you wish to read a record but can't remember its number, you can select option 5 to search for a string. Suppose you want the file on John Jones. Select option 5 and enter John Jones at the prompt. File Lord will scan the records until it finds that string or reaches the end of the records. When it finds a match, it will display that record onscreen. If it finds more than one record, it will display them one at a time, in the order that they were found.

Delete a Record

You can delete unwanted information quite easily. Find the record number you wish to delete and then select option 3. When a record is deleted, all the record numbers that are higher will be decreased by one.

Print a Record

Use option 6 to dump a record to the printer. Make sure your printer is

turned on and ready before choosing this feature.

Other Options

If you select Delete a File, this option will scratch from the disk the file currently in memory. Use this option if you're modifying a file; scratch the old file before saving the new version.

Save This File will save the file currently in memory, with the filename that you specified when you created it.

Load a file by entering the corresponding option number and following the prompts.

You can view a disk directory by pressing the Shift key and the 4 key simultaneously. To stop a directory listing, press f7. Restart the listing by pressing f5.

Press Shift-Q when you wish to exit File Lord and return to BASIC.

FILE LORD

0801:0B	08	70	17	9E	32	34	30	6E
0809:37	00	00	00	20	20	20	20	96
0811:20	20	20	20	20	A0	C4	B9	06
0819:3C	08	99	F8	00	B9	FD	08	F6
0821:99	33	03	88	D0	F1	A0	09	4C
0829:B9	0C	08	99	FF	03	88	D0	A1
0831:F7	A9	B0	85	2D	A9	19	85	DD
0839:2E	4C	00	01	0D	60	01	B0	20
0841:19	33	13	B9	6E	09	99	E8	5C
0849:07	C8	D0	F7	EE	02	01	EE	19
0851:05	01	C6	F9	D0	ED	A2	03	23
0859:20	34	03	F0	33	C9	07	D0	95
0861:16	A2	01	20	34	03	D0	0A	A0
0869:A2	04	20	34	03	18	69	07	65
0871:10	05	A2	0A	20	34	03	85	1D
0879:A8	A5	A7	85	A9	A5	FE	85	FB
0881:F7	A5	FF	85	F8	20	6C	03	73
0889:A5	F8	85	FF	A5	F7	85	FE	72
0891:E8	20	34	03	D0	1E	A2	08	21
0899:20	34	03	A0	02	84	A8	85	2A
08A1:A6	18	A5	FC	65	A6	85	F7	58
08A9:A5	FD	65	A7	85	F8	20	6C	EF
08B1:03	4C	13	01	E8	20	34	03	FB
08B9:D0	1C	A0	03	84	A8	E8	20	36
08C1:34	03	F0	08	A2	08	20	34	F4
08C9:03	4C	5C	01	A2	0C	20	34	C3
08D1:03	E6	A7	4C	5C	01	E8	20	AF
08D9:34	03	D0	0A	E8	20	34	03	B2
08E1:18	69	04	A8	D0	D6	E8	20	37
08E9:34	03	D0	0A	A2	02	20	34	21
08F1:03	18	69	06	D0	ED	A2	08	A2
08F9:20	34	03	D0	E6	A9	00	85	F7
0901:A7	A4	FB	F0	0C	06	FA	2A	37
0909:26	A7	C6	FB	CA	D0	F2	A8	D8
0911:60	48	B1	FE	85	FA	A9	08	FE
0919:85	FB	68	A4	FE	D0	02	C6	4A
0921:FF	C6	FE	C0	E7	D0	DE	A4	B5
0929:FF	C0	07	D0	D8	A9	37	85	BA
0931:01	58	4C	0D	08	A4	A8	F0	49
0939:22	A5	F7	38	E5	A8	B0	03	7E
0941:C6	F8	38	85	F7	A5	FC	E5	8A

PROGRAMS

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0949:A8 B0 02 C6 FD 85 FC B1 3A
0951:F7 88 91 FC 98 D0 F8 C4 42
0959:A9 F0 0A B1 F7 C6 FD C6 76
0961:F8 C6 A9 10 EC 60 78 E6 98
0969:01 4C 16 08 60 00 0B 08 73
0971:C8 07 9E 32 30 36 31 00 5D
0979:00 00 E6 9F 78 A5 01 29 E7
0981:FE 85 01 A9 C1 8D 18 03 A6
0989:A9 34 8D 14 03 58 C5 75 EA
0991:BA A2 D5 8D EF B4 DC 79 C2
0999:0F A8 D3 99 00 D4 F0 4E F4
09A1:11 F6 A9 09 8D 05 97 E1 51
09A9:8D 02 D4 A9 0E 20 00 78 A1
09B1:6E F2 93 E4 23 1B 02 27 29
09B9:F0 2F C9 D1 F0 31 C9 32 78
09C1:F0 30 C9 31 F0 32 C9 34 BC
09C9:F0 39 C9 33 F0 3B C9 35 4C
09D1:CF E0 49 93 36 F0 3F C9 24
09D9:29 F0 46 C9 CC F0 48 C9 A6
09E1:28 F0 4A C9 24 F0 4C 4C F3
09E9:4E EE 08 50 0D 84 4C D7 CF
09F1:50 41 2B C8 1C 28 C0 C7 39
09F9:20 1F 0A 5E 41 1C 4E C1 E3
0A01:AC 0B 4C 5E 41 56 0C A5 BE
0A09:90 DF 0C D5 38 1A 05 30 A0
0A11:39 0B EE 0E 5B 05 98 39 9C
0A19:05 CE 0F 4C 46 08 BB 78 4C
0A21:83 3B 63 11 06 F0 E0 8D 86
0A29:85 E5 4C E2 FC A7 A9 92 9D
0A31:21 DD 02 14 B3 B1 FB 41 6C
0A39:39 85 CD 20 0B 61 A1 FC 25
0A41:08 93 4E 11 0D 3B 60 F5 25
0A49:AC 06 42 11 56 0C 10 F3 85
0A51:00 07 75 31 1F 87 31 94 F6
0A59:44 80 EB 3C 1E 15 1E EF 62
0A61:C1 E1 C9 D0 90 03 4C 19 57
0A69:09 C1 2D 52 C3 A9 E7 8C 5E
0A71:E4 AE B2 02 F3 49 0C 14 0B
0A79:F0 49 0C 86 82 6F F6 70 72
0A81:9C 86 A9 F1 1B 20 1C 95 01
0A89:A1 C3 01 54 46 A9 1D CC A4
0A91:AF B0 06 91 FB C8 4C 9D BC
0A99:09 18 81 38 03 10 A8 B0 46
0AA1:18 20 F4 78 0C A8 3C 23 8E
0AA9:00 72 CF EC 9B E8 EC 1C 99
0AB1:E5 94 43 55 10 E7 80 15 D1
0AB9:44 3A 10 40 7A 51 13 1A DD
0AC1:E9 05 60 4C 2B 09 4C 38 2B
0AC9:0F 4C 24 06 71 01 B4 0B 61
0AD1:4C 5E 0C 4C 42 12 4C E7 C4
0AD9:0C E4 6E C5 02 23 30 CE 23
0AE1:87 CE E3 9E 4F F3 2C 8A 01
0AE9:38 10 04 AD E9 18 5F D0 B8
0AF1:D7 03 6D 15 20 D6 CD 07 01
0AF9:01 CE 42 02 F0 BF 47 52 12
0B01:BE 4C 11 C0 C9 05 F0 AD A9
0B09:20 01 12 3C 23 E4 9F 20 81
0B11:A0 0E D4 2C B6 87 18 09 65
0B19:8D 1B D1 C9 30 90 28 C9 71
0B21:3A B0 24 C8 E2 32 82 EF 66
0B29:20 19 14 99 3D 13 4F F6 7D
0B31:15 3C D9 0D 4C 8D 0A 73 0D
0B39:06 F0 8B 6E 21 60 08 3A BB
0B41:10 51 42 18 15 12 90 52 E1
0B49:B8 38 A9 AF ED 94 0E A9 81
0B51:19 ED 79 0E 1B 7E B5 C0 7E
0B59:F0 A0 6D B6 02 5E 1F 60 51
0B61:10 00 C2 AD E9 10 00 5D 9F
0B69:B3 73 00 31 D0 DB D4 02 EA
0B71:B2 02 D0 D3 98 50 61 E1 63
0B79:41 1A 84 A6 C9 07 D0 F5 B3
0B81:A9 99 FB 6D AE F4 E8 6C B0
0B89:64 0A F1 76 00 D0 05 78 BF
0B91:14 A3 F1 08 11 F0 18 B5 8B
0B99:CF 63 1D 39 40 E1 61 56 4A
0BA1:20 80 88 87 73 CD 43 90 5B
0BA9:51 40 32 45 6B 90 33 02 19
0BB1:B0 CD 02 B0 03 4C A5 82 F5
0BB9:3D 97 92 04 60 1D F0 2D 6D
0BC1:C9 9D F3 42 08 0D F0 9F BC
0BC9:4C 6A 0B ED C9 02 B0 07 9F
0BD1:50 3E 14 2F C5 60 41 00 47
0BD9:83 45 ED 46 65 46 4C 84 86
0BE1:14 3B 0B 20 16 0B 4C 1C C5
0BE9:0B 08 4F 02 95 D4 C6 79 98
0BF1:64 C0 C4 D7 47 06 5C 3C C7
0BF9:36 0A 19 FE 60 C8 4C 05 84
0C01:0C BA D5 8C 66 C0 80 F6 7F
0C09:6D 78 85 FD E8 85 FE 87 69
0C11:5E E7 E4 79 9D DC 07 02 F6
0C19:08 A0 C9 88 C3 D0 88 28 B9
0C21:28 38 05 19 44 D0 0B 28 31
0C29:21 3E 19 C4 1C 9A 84 60 85
0C31:E9 35 0C EB 38 7A 0D 18 A9
0C39:87 AE 69 F9 C8 AD 21 69 36
0C41:10 8E 0C 44 03 41 9C 12 33
0C49:07 7F ED 9E AC E2 09 44 24
0C51:AE 1A 05 28 F3 6C EA 41 D2
0C59:07 34 30 81 28 CD 91 23 DE
0C61:90 56 A9 AF CC 00 82 10 03
0C69:14 81 14 62 8A 22 50 80 92
0C71:7C B1 FB DD BB F0 27 27 A8
0C79:4E B0 87 34 08 AD 13 0C 42
0C81:00 14 2C 20 36 0C CD AC 50
0C89:FA DE AD AD 02 CD AB 19 1F
0C91:D0 D6 80 78 2C BB 30 1C 2C
0C99:98 0C E8 EC 18 D5 DD B4 75
0CA1:0A A0 34 98 00 88 44 0C AD
0CA9:4C B5 0C 60 A9 04 08 87 D1
0CB1:0A 61 79 0C 42 ED 20 4E 6F
0CB9:0A CE B7 8D B2 94 11 4A AE
0CC1:AF 4E F0 D5 C9 59 D0 6E 84
0CC9:3D A5 FB ED A9 19 35 2F 9B
0CD1:E9 1C F3 22 10 E6 1A 95 6C
0CD9:80 01 A2 04 A0 07 B7 31 C8
0CE1:E0 A2 01 7A 88 C3 07 E0 1D
0CE9:0E A2 11 57 C9 25 BA BC
0CF1:02 A9 01 CC B9 20 FE 45 F3
0CF9:41 A7 6E EC C8 04 8C 47 EF
0D01:D0 E7 20 79 0F 7C 04 0B 96
0D09:20 6C AF 02 B0 63 F5 53 B6
0D11:36 F1 1B E2 42 20 88 CA C2
0D19:22 1F 08 93 99 EE 18 BD BC
0D21:92 F4 A9 E8 BD 5A 16 85 8E
0D29:A0 A2 09 20 CE 0E 20 5E AC
0D31:D7 12 45 BA EE 72 B0 05 B7
0D39:63 0B 1A CC 1A 30 D0 F5 01
0D41:AA 81 16 A9 1D 91 FD C8 62
0D49:4C C8 E0 E9 E0 52 CE F6 5B
0D51:70 12 31 4A E5 11 70 61 A8
0D59:02 71 06 FA 40 8C 17 C5 69
0D61:84 71 0B C5 84 E1 A9 3F 16
0D69:25 3E 76 0C 01 7B 1C 11 CC
0D71:D0 CF C9 3A B0 CB D9 1E 2B
0D79:D0 3B DA E0 C9 31 D0 BD A6
0D81:81 32 C9 30 90 B6 C9 39 51
0D89:B0 B2 0D 2F 26 AC B2 AA 31
0D91:9B 02 F0 1B AD 34 BF 49 D0
0D99:A3 A3 18 6D 0A 2A 7C 60 9A
0DA1:95 E0 F0 12 4C EF 0D AD E7
0DA9:36 E0 C4 84 18 69 0A 99 0C
0DB1:A1 19 4C 53 C3 39 B9 72 8A
0DB9:12 7C 13 20 23 71 63 3C 42
0DC1:0F 4C 7F 0E 3C BD 81 A0 C3
0DC9:AD B5 02 B7 F5 60 4C 50 FD
0DD1:0D AE 16 AD 5E E0 21 14 88
0DD9:20 8A 12 38 75 CC 09 02 5F
0DE1:0D 8F 5D D0 E0 01 0D D0 15
0DE9:F6 3C 46 C0 B8 87 FF 22 69
0DF1:7B E4 48 20 0D 84 B1 FB E7
0DF9:C9 2A D0 F2 20 0B 09 8A 96
0E01:97 10 11 06 72 4C D2 B4 8E
0E09:3C 49 20 34 11 A9 10 8D B9
0E11:A7 05 97 E9 10 1F 34 09 42
0E19:35 A0 03 35 9F 0C A0 9F B9
0E21:79 08 17 20 D5 0A 29 C4 CE
0E29:05 8D BA 02 4C 1F 0A 20 B5
0E31:83 8B 7F CD 55 F3 55 80 64
0E39:A2 EE 55 62 71 58 66 C8 B5
0E41:81 A9 E9 85 FB 18 A2 09 AC
0E49:FC AE A5 AC 21 1C FB 20 A0
0E51:D8 9D 07 20 E0 70 01 06 F4
0E59:D0 A9 AF 8D AD 49 00 07 B0
0E61:AE 19 C4 AA D4 2C E9 88 12
0E69:00 68 8D FE 18 8D AB 19 A8
0E71:8D AC 19 60 20 50 11 20 2D
0E79:98 12 48 B7 0D F5 20 D9 45
0E81:12 18 AD EA 18 69 03 A2 20
0E89:EB A0 18 9E CF 0F E4 CC 02
0E91:0F 34 33 0F 4C 73 19 17 13
0E99:48 00 BB 4C AD 0E A7 B4 F7
0EA1:20 D0 8D 21 D0 DB 2A 1A 2A
0EA9:92 A2 92 A0 10 20 BD EC 7D
0EB1:A2 08 59 B9 20 BA 90 C0 B5
0EB9:83 10 08 20 B4 18 6F 85 09
0EC1:B9 20 96 87 92 80 C1 BE E6
0EC9:20 A5 FF C9 30 D0 B7 20 50
0ED1:AB FF A2 2E 77 00 B8 E2 0B
0ED9:57 E0 60 DA 20 C9 78 00 AC
0EE1:9A 40 D0 2F AD B2 07 5C 0B
0EE9:85 F3 29 28 0C 86 38 0D 65
0EF1:B0 A8 20 3F 65 A0 AA 51 DC
0EF9:20 93 A8 38 A0 32 30 05 D3
0F01:82 F0 23 22 C9 50 10 A5 78
0F09:CB C9 03 F0 0F C9 06 E3 7E
0F11:5F 70 90 C1 07 07 71 74 D4
0F19:B1 02 4C 2C E2 01 8C 05 16
0F21:4C 26 10 1E 20 C6 FF A9 98
0F29:02 20 C3 19 70 00 D1 34 B5
0F31:4C 44 12 24 D5 8E 68 12 D6
0F39:A2 09 8E 2C A0 B0 85 20 72
0F41:DD 1A 08 AD 39 FD DB 10 3A
0F49:90 C0 1E F0 02 AD 2B FD 6A
0F51:D0 10 8D F1 02 C8 D0 E3 6D
0F59:98 CA F0 11 C9 B0 F0 03 9B
0F61:8D B0 2E 2C F2 02 30 05 FF
0F69:AD EF 02 F0 05 29 7F A0 16
0F71:9C AC CA 10 C4 60 01 00 0D
0F79:0A 00 64 00 E8 03 10 27 C3
0F81:E7 18 45 A9 0F 0D F9 A9 27
0F89:FF 8D 00 94 04 14 8D 01 E0
0F91:46 41 20 1D 85 4A A1 00 91
0F99:30 60 FF D0 FB 63 11 40 C4
0FA1:00 11 CB 4D 4B D0 EE A9 77
0FA9:40 8D 04 04 70 1C AD 21 7C
0FB1:00 59 CC 02 C9 02 D0 06 DD
0FB9:A9 00 8D 18 D4 60 A9 07 62
0FC1:4C F4 60 3A 5C 9B 4E 0A EA
0FC9:C0 E1 9B 11 92 D5 50 C6 98
0FD1:17 03 3B D4 0F 44 12 3C DA

```



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0FD9:10 A7 F7 40 C4 13 03 71 D6
0FE1:BA 0F 44 86 47 4C C7 CE DB
0FE9:43 0D 3C 42 09 F5 40 C4 FD
0FF1:18 E3 95 41 BE 33 43 7E A3
0FF9:07 09 2C 71 ED EC 65 78 E0
1001:E8 81 E4 AC C4 11 B3 54 83
1009:F0 4F 43 19 3C 0D 24 F1 BF
1011:F4 C4 53 A3 16 29 8F 43 39
1019:0A 3C 2F 62 F3 40 C4 0F 92
1021:03 B1 E1 91 92 E3 11 15 DF
1029:8F 47 77 3D 1E 71 58 15 22
1031:66 A2 11 B9 52 78 15 10 99
1039:CF 51 D9 B3 04 A8 17 58 55
1041:1B 48 3B 0D 20 72 03 48 52
1049:20 F5 34 C4 DC D3 10 0B 2B
1051:4F 43 C0 3C 0D 1C F1 74 F6
1059:14 0F A5 16 D5 C3 1B CE 20
1061:4C E5 10 83 0D 00 21 33 39
1069:00 C0 08 D0 F5 9A 40 7A DC
1071:12 84 36 C9 59 F0 07 C9 85
1079:4E F0 06 4C 9B 1F 77 01 CB
1081:11 08 00 D9 A5 FD 69 12 D3
1089:40 05 A5 FE 0A 02 FE 60 66
1091:A9 FF 85 FD A9 18 85 FE CE
1099:8E D7 14 09 18 AD 15 01 AC
10A1:A0 02 B2 02 60 17 5B FC 1C
10A9:6E 1C 4C EC 2C 14 DE 19 E8
10B1:9F A9 05 44 90 3E 43 90 85
10B9:91 9D 91 01 C4 20 E4 FF BC
10C1:C9 0A E6 F9 8D 90 C9 81 89
10C9:B0 5A C9 14 F0 3D C9 0D 70
10D1:F0 24 C9 20 F0 E6 C9 22 84
10D9:F0 E2 C9 2C F0 DE C9 7B 39
10E1:B0 DA AD BC 02 87 0F 1E FC
10E9:A2 CC A7 02 F0 CF 95 CA 60
10F1:49 13 F2 28 28 00 F0 BF 3F
10F9:F2 2E 8A 84 0C 0F EE 60 93
1101:06 60 AC A8 C0 01 B0 C1 8B
1109:1C 32 54 38 9A DF E9 E6 E2
1111:02 4C 04 13 F0 80 80 4C CF
1119:12 13 71 1A 08 FB E4 19 EB
1121:5A 0A 20 C1 12 6D A4 93 36
1129:9E 91 38 52 B9 EE 18 0C F0
1131:6A EA 27 F4 A9 0D CE 1A B0
1139:0A 43 48 A9 96 67 A2 20 8C
1141:DC 12 BD A1 19 8D E0 32 1B
1149:00 B1 FD C9 1D F0 4F C2 42
1151:23 C0 12 D0 F2 99 46 B0 BF
1159:AD BA 50 35 04 F0 05 A9 F5
1161:60 0D FF 30 66 10 11 32 C1
1169:B1 FB 20 D2 FF 37 1C 38 E1
1171:D0 EE AD B9 02 C9 01 F0 33
1179:0E 18 A5 FB 6D B3 02 85 E0
1181:FB A5 FC 69 00 85 FC E8 3A
1189:20 B3 12 20 CF 12 CD FE 4E
1191:18 D0 95 60 A9 20 4C C0 D3
1199:40 E1 09 2E 4C E4 13 A9 1E
11A1:00 18 A6 B0 29 AE 0A 2E EF
11A9:90 3C A2 00 BD E5 38 E9 57
11B1:21 22 40 18 BD 88 B1 02 EB
11B9:D0 BD 8D 14 8D C0 05 A0 C0
11C1:00 4C 59 14 95 81 02 6D 87
11C9:B0 42 AD 02 AD B0 02 6D 4C
11D1:B1 02 8D AE 02 C8 0C AF 66
11D9:02 D0 E7 E8 E0 E7 21 C7 6D
11E1:60 A0 05 88 B9 3C C8 99 6F
11E9:40 09 88 C0 00 D0 F3 A9 60
11F1:30 8D 35 03 18 AD CA 09 7C
11F9:69 01 8D 34 03 C9 05 D0 20
1201:DF 4C 28 14 27 03 00 00 B3

```

```

1209:00 10 E8 64 0A 01 93 5C 6C
1211:F0 E3 40 96 0F 34 D8 9A AD
1219:2E 2E 47 50 59 41 7F E0 7D
1221:2E 31 39 39 32 D3 8E CC 2E
1229:C3 4F 4D 50 55 BB D0 55 42
1231:42 4C 49 43 41 54 49 4F 24
1239:4E 56 F2 0F C9 21 87 09 54
1241:CC 54 FA 00 90 0B 1C C1 EA
1249:AF C2 0C 95 C0 53 D1 53 1B
1251:68 88 56 45 44 11 11 B5 29
1259:63 C3 31 A7 73 E3 03 34 26
1261:3C 4E 32 7C 3C D7 1A 13 CD
1269:D1 F8 58 F1 33 11 AD F0 09
1271:00 87 8E 38 3C 36 34 7C 6C
1279:3C 32 0C 4A 8E 9C 53 78 10
1281:42 36 35 7C 08 33 10 04 F3
1289:C6 1E 66 D3 60 2A 43 23 F7
1291:64 C3 36 27 A4 D2 81 0A 8F
1299:D4 4F 20 D0 52 78 F7 43 B4
12A1:E3 63 C3 37 E7 A3 C3 91 63
12A9:07 CE 78 E4 81 00 19 F1 92
12B1:38 D9 CA 10 08 38 A8 36 6B
12B9:3C 46 3C 9C C1 D3 41 83 42
12C1:70 83 D4 59 03 8C 8D 11 A5
12C9:CC 9F 8D 82 08 4A 81 C1 44
12D1:C1 D9 F0 D8 F0 24 F1 28 1D
12D9:08 20 32 C4 98 4C B0 01 F4
12E1:82 09 88 A6 A2 A3 C2 E3 12
12E9:9A 20 C5 C3 98 61 C6 44 74
12F1:84 00 CC 67 11 0D 11 A8 EF
12F9:81 8C 00 38 96 28 37 2D 76
1301:D1 D1 75 D5 53 C2 D3 90 6E
1309:34 A8 20 D7 49 B3 35 20 98
1311:CB 45 59 0D 00 A6 00 4E 53
1319:1C A1 0D 8D 61 06 A1 79 10
1321:71 20 73 A2 25 88 29 AC EA
1329:F7 96 11 80 F4 68 4F 57 52
1331:8E AD 4E C1 86 87 8D 41 9E
1339:3F 96 AA CC 39 29 0D 4B 9A
1341:8C 6E 41 4D 8F 3F 49 32 84
1349:20 54 4D 3E 43 4F 4E BA D0
1351:02 48 52 44 AC 0C 4F 55 A2
1359:52 AC A0 18 46 93 82 49 38
1361:58 AC 83 73 45 56 EE B4 9C
1369:30 65 49 47 48 40 83 6E 57
1371:86 1D A4 48 05 03 1E 80 2C
1379:B8 65 10 44 D0 70 02 40 28
1381:6D 41 58 49 4D 4D 00 8D 7B
1389:6E 55 4D 42 39 DF 80 88 DC
1391:63 48 41 52 2A 23 20 52 39
1399:4E 50 80 20 2B BA 61 07 1B
13A1:65 41 B0 64 00 49 07 11 6B
13A9:D6 28 31 2D 31 38 29 98 93
13B1:19 04 9A 44 63 69 87 00 CC
13B9:EE 63 76 36 C0 43 45 1C 1C
13C1:C0 2E 0E 0B 99 A9 6F 55 ED
13C9:A0 39 6F 46 20 6D 45 4D 6F
13D1:EE 59 20 21 21 21 1C 62 04
13D9:09 50 6E 4F 24 8D 38 A6 C9
13E1:45 53 45 2C 0A 3E 00 04 38
13E9:00 43 6F 7C 92 C1 7C 63 8E
13F1:2E 23 01 20 98 67 72 65 C6
13F9:73 73 14 70 61 63 65 20 C3
1401:62 61 72 12 0E 39 C7 45 4C
1409:89 C7 E9 86 48 A7 28 43 02
1411:51 3F 1C 20 79 2F 6E DD 7A
1419:55 77 D0 CD 3F 20 93 0D 6F
1421:1C 1D 1D 12 2A 20 71 55 6D
1429:CB 2D 00 63 52 82 3E E0 B2
1431:A1 6E 45 57 A3 9B 77 A7 06

```

```

1439:09 5E 36 3C 0C E0 6A 03 C3
1441:E4 43 52 4F 4C 4C DE 88 C5
1449:53 79 A4 EE A0 00 8E 39 58
1451:68 45 41 52 43 48 F4 04 75
1459:1E 20 A4 73 54 82 47 68 08
1461:24 72 45 43 4F 52 14 74 75
1469:4F 20 70 52 49 4E 02 B8 B4
1471:52 88 30 6C 4F 41 44 20 D9
1479:C3 73 41 56 7D 06 61 12 C6
1481:31 64 45 D7 54 82 24 64 DA
1489:49 53 4B 20 66 49 4C 45 CC
1491:20 2A 0D 0D 96 38 BF 53 2F
1499:30 3A 35 D1 11 0F A8 51 93
14A1:8F 93 28 8F 89 14 8F 84 B4
14A9:0A 0F 82 0D 81 2A 2A 2A EE
14B1:CE 60 0E 81 22 00 00 00 44
14B9:C0 00 00 00 00 00 00 00 42

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Daniel Lightner has had numerous programs published in Gazette. His most recent was File Copier (November 1991). He manipulates his files in Sidney, Montana.

PIXEL MOVER

By Hong Pham

One of the many interesting features of the VIC-II chip is its ability to support smooth scrolling, both vertically and horizontally. With a single POKE to location \$D011 or \$D016 (53265 and 53270, respectively), the screen will smoothly scroll in a vertical or horizontal direction—but only for seven pixels.

When the seven-pixel limit is reached, a program is required to scroll the screen's contents one character further. BASIC is too slow, however, to move the contents fast enough to prevent annoying jitters.

With Pixel Mover, you can smoothly scroll the entire screen pixel by pixel in eight different directions without any jitters. Or if you like, you can scroll up to eight pixels at a time. Best of all, with Pixel Mover installed, you can do it quite easily with just one powerful SYS command from your BASIC program.

Getting Started

Because Pixel Mover is written entirely in machine language, use MLX, our machine language entry program, to type it in. See "Typing Aids" elsewhere in this section. When prompted for starting and ending addresses, respond with the following values.

Starting address: CAB0

Ending address: D001

PROGRAMS

When you've finished typing in Pixel Mover, be sure to save it to a work disk under the given name because Relocator and Demo, a demonstration program, search for that name.

To activate Pixel Mover, enter the following commands: LOAD "PIXEL MOVER",8,1; NEW; and SYS 51888.

SYS and POKE Parameters

Because Pixel Mover is totally relocatable, a fixed address should not be used. Instead, use a variable to represent the starting address and use offsets of the variable to access subroutines or memory locations within the program. The default base or starting address is \$CAB0 (51888). For example, if you let SA equal starting address 51888, then SYS 52013 would be written as SYS SA + 125.

SYS SA

Use this SYS with a variable set to Pixel Mover's starting address to activate the program. An important interrupt program that is necessary for Pixel Mover's subroutines to work is activated once this command is made.

SYS SA + 51

This SYS will disable Pixel Mover and restore the former interrupt vector.

SYS SA + 125, direction, amount

This scrolls the screen in a direction specified by the first parameter. The following figure illustrates the directional values.

```
7 0 1
 \ | /
6- -2
 / | \
5 4 3
```

The second parameter, a value between 1 and 320, indicates how many pixels to scroll in that direction.

If you are calling this routine from machine language, use JSR SA + \$70 (112). Use the X register to indicate the direction of the scroll, the Y register to indicate the LSB of the amount to scroll, and the accumulator to represent the MSB.

POKE/PEEK (SA + 87)

This is the shadow location for the VIC-II 53270 location. Read and write to this location instead of the standard 53270 location. For example, to switch to multicolor mode, use POKE SA + 87, PEEK(SA + 87) OR 16 instead of POKE 53270, PEEK(53270) OR 16.

POKE/PEEK (SA + 92)

Poke or peek to this location instead of using 53265. For example, to switch to hi-res mode, use POKE SA + 92, PEEK(SA + 92) OR 32 instead of POKE 53265, PEEK(53265) OR 32.

POKE/PEEK (SA + 97)

To change the screen memory or the character memory, poke to this location instead of the standard VIC-II 53272 location.

POKE 648, page number

If you are switching to a new screen memory location, set the corresponding page number to location 648. To determine the page number, divide the screen memory location by 256. The default value for this location is 4 (screen memory set at 1024).

Make sure that the screen location is within the VIC-II's 16K video bank. If there's a need to access memory locations beyond this 16K bank, change the bank accordingly (it's beyond the scope of this article to explain how).

POKE SA + 700

Poke to this location to set the page number of the buffer screen location. This is the secondary screen where the text is manipulated and then transferred back to the default screen.

When Pixel Mover scrolls the screen by one character, the contents of the default screen are transferred to the secondary screen and then manipulated. Pixel Mover relocates the screen memory to the secondary screen and then transfers the contents in the secondary screen back to the default screen. After this is finished, Pixel Mover defaults back to the original screen memory. Like the default

screen, the secondary screen must be placed in the same bank. When writing large BASIC programs, it's advisable to relocate the VIC-II video bank and screen memory to prevent Pixel Mover from corrupting the BASIC program.

The default value for the location of the secondary screen is \$3C, or decimal 60 (screen memory is at \$3C00, or 15360).

POKE SA + 706

Set the page number of the color memory buffer location. Pixel Mover copies the contents of the color memory at \$D800 (55296) to a buffer area where the contents are manipulated, and then Pixel Mover recopies them back to the original color memory. Because the color memory can't be relocated and because of the 64's slow speed, colors may smear a bit as the screen scrolls. This problem is easily observed when adjacent contrasting colors are scrolled. Unlike the buffer screen, the color memory buffer can be set to any location in memory provided that it starts on a page. The default value for this location is \$40, or decimal 64 (the buffer location is at \$4000, or 16384).

POKE SA + 375

Use this command to adjust the vertical scroll delay counter. Slow down or speed up the scrolling speed by increasing or decreasing the delay value (the lower the value, the faster the scrolling speed, and vice versa). The default value is 18.

POKE SA + 372

This will adjust the horizontal scroll delay counter. The default value is 18.

POKE SA + 1335

This location adjusts the diagonal scroll speed. The default value is 22.

POKE SA + 599

Poking this location will set the horizontal scroll wrap on or off. If the argument is a 0, any character that is about to be scrolled off the screen will wrap around and be placed on the next line. Any oth-

er arguments will disable this feature.

POKE SA + 211

If a 0 is poked to this location, Pixel Mover will scroll the screen one pixel at a time. If any other value is poked to this location, then Pixel Mover will scroll the screen eight pixels at a time.

Jump Vectors

For every eight pixels scrolled, Pixel Mover performs a JMP to an RTS instruction. You can take advantage of this setup by setting the JMP instruction to jump to your own scrolling routine, such as when you want to display a new line. Be sure to write the new line to the buffer screen and terminate the routine with an RTS. There are four such JMP instructions for the four basic scroll directions: left, right, up, and down. Write the new JMP address to the following offset in low byte, high byte order.

SA + 608 to move left
SA + 688 to move right
SA + 1168 to move up
SA + 1243 to move down

A Demonstration

To see what Pixel Mover can do, type in and run Demo. It will demonstrate how different commands can be used to create various effects in your own programs. Demo is written entirely in BASIC. To help avoid typing errors, enter it using The Automatic Proofreader. See "Typing Aids" again. After you've finished typing, be sure to save it to a disk containing Pixel Mover, or the program will crash when you try to run it. If you saved Pixel Mover with some other filename, be sure to use that name in line 40 of Demo.

A New Location

Pixel Mover was designed to be compatible with other programs, but it resides in an area that's very popular with many other ML programs, such as fast loaders. When Pixel Mover and other ML programs try to use the same memory area, disaster can occur.

Relocator solves this potential problem by relocating Pixel Mover to another area in memory. Since Relocator is written in machine language, type it in

with MLX. At the prompts, respond with the following values.

Starting address: 0801

Ending address: 0EC8

To relocate Pixel Mover, simply load and run Relocator. When Relocator prompts for a new starting address for Pixel Mover, enter the desired address in hexadecimal. If you know the decimal value but not the hexadecimal value, the following program will convert any decimal value to a hexadecimal equivalent.

PE 10 HS = "0123456789ABCDEF": B = 16:

B1 = 2 ↑ B

FP 20 INPUT "ENTER DECIMAL VALUE":N: IF
ABS (N) > B1 - 1 THEN 20

PP 30 NS = "": IF N < 0 THEN N = B1 + N

FF 40 FOR I=1 TO B/4:T = N - (INT (N/16) *
16): NS = MID\$(HS,T + 1,1) + NS: N = N/
16

CG 50 NEXT: PRINT NS

After Relocator relocates Pixel Mover, insert a work disk to save the new version. If the save is successful, you may exit to BASIC or relocate another copy of Pixel Mover.

PIXEL MOVER

CAB0:78 A9 7F 8D 0D DC A9 81 66
CAB8:8D 1A D0 AD 11 D0 29 7F 2E
CAC0:8D 11 D0 AD 14 03 AE 15 75
CAC8:03 8D 1E CB 8E 1F CB A9 F5
CAD0:FC A2 CA 8D 14 03 8E 15 9E
CAD8:03 AD 18 D0 8D 11 CB 58 0C
CAE0:4C 76 CD 78 A9 81 8D 0D F6
CAE8:DC A9 00 8D 1A D0 AD 1E BD
CAF0:CB AE 1F CB 8D 14 03 8E 0A
CAF8:15 03 58 60 AD 19 D0 8D EB
CB00:19 D0 29 01 F0 17 A9 CB 8D
CB08:8D 16 D0 A9 1B 8D 11 D0 A2
CB10:A9 15 8D 18 D0 A9 01 8D B1
CB18:12 D0 8D BF CC 4C 31 EA 7F
CB20:8E 58 CB 84 27 85 28 20 96
CB28:62 CD 4C 43 CB 20 62 CD 93
CB30:20 F1 B7 8E 58 CB 20 0E 74
CB38:E2 20 8A AD 20 F7 B7 84 4A
CB40:27 85 28 20 57 CB A5 27 30
CB48:D0 02 C6 28 C6 27 A5 28 6A
CB50:D0 F1 A5 27 D0 ED 60 A2 95
CB58:FF F0 15 CA F0 15 CA F0 DD
CB60:21 CA F0 12 CA F0 18 CA 8F
CB68:F0 0F CA F0 0F 4C 95 CC 46
CB70:4C 08 CC 4C 71 CC 4C 7D 63
CB78:CC 4C 89 CC 4C DC CB 4C 41
CB80:45 CC A9 00 F0 0C 20 B9 D4
CB88:CC 20 12 CD 20 26 CC 4C 2D
CB90:D0 CB AD 07 CB 29 07 C9 84
CB98:07 F0 06 EE 07 CB 4C 26 C5

CBA0:CC 20 12 CD AD 07 CB 29 10
CBA8:F8 8D 07 CB 38 08 20 D0 B0
CBB0:CB 28 B0 0E AD 24 CC C9 90
CBB8:15 90 14 38 E9 14 AA 4C 46
CBC0:2B CC AD 27 CC C9 19 90 99
CBC8:06 38 E9 18 4C BE CB 60 85
CBD0:20 A1 CC 20 B9 CC 20 8D 4B
CBD8:CF 4C AD CC AD 83 CB F0 F1
CBE0:09 20 B9 CC 20 C3 CC 4C FE
CBE8:8C CB AD 07 CB 29 07 F0 E1
CBF0:06 CE 07 CB 4C 26 CC 20 91
CBF8:C3 CC AD 07 CB 29 F8 09 C9
CC00:07 8D 07 CB 38 4C AD CB 38
CC08:AD 83 CB F0 0C 20 B9 CC 03
CC10:20 F7 CE 20 23 CC 4C D0 49
CC18:CB AD 0C CB 29 07 F0 14 9C
CC20:CE 0C CB A9 12 2C A9 12 DE
CC28:AA F0 08 A0 00 88 D0 FD 20
CC30:CA D0 FA 60 20 F7 CE AD F4
CC38:0C CB 29 F8 09 07 8D 0C 0B
CC40:CB 18 4C AD CB AD 83 CB 12
CC48:F0 09 20 B9 CC 20 42 CF 77
CC50:4C 13 CC AD 0C CB 29 07 32
CC58:C9 07 F0 06 EE 0C CB 4C A2
CC60:23 CC 20 42 CF AD 0C CB FF
CC68:29 F8 8D 0C CB 18 4C AD 4C
CC70:CB 20 DA CF 20 08 CC 20 2B
CC78:82 CB 4C F4 CF 20 DA CF A3
CC80:20 82 CB 20 45 CC 4C F4 31
CC88:CF 20 DA CF 20 45 CC 20 3A
CC90:DC CB 4C F4 CF 20 DA CF E8
CC98:20 08 CC 20 DC CB 4C F4 83
CCA0:CF AD 11 CB 29 0F 0D CF DB
CCA8:CD 8D 11 CB 60 AD 11 CB 13
CCB0:29 0F 0D C6 CD 8D 11 CB 43
CCB8:60 A9 00 8D BF CC A9 00 4A
CCC0:F0 FC 60 A2 00 BD 01 FF 41
CCC8:9D 00 FF BD 01 FF 9D 00 50
CCD0:FF BD 01 FF 9D 00 FF BD A4
CCD8:01 FF 9D 00 FF BD 01 D8 78
CCE0:9D 00 FF BD 01 D9 9D 00 CF
CCE8:FF BD 01 DA 9D 00 FF BD 6A
CCF0:01 DB 9D 00 FF E8 D0 CD C8
CCF8:A9 20 8D E7 FF AD 86 02 65
CD00:8D E7 FF 20 CE CF A9 00 67
CD08:F0 05 A2 27 D0 D3 CE 4C 5E
CD10:FE CF A2 00 BD FF FF 9D FE
CD18:00 FF BD FF FF 9D 00 FF E1
CD20:BD FF FF 9D 00 FF BD FF EF
CD28:FF 9D 00 FF BD FF D7 9D 66
CD30:00 F6 BD FF D8 9D 00 FF 7E
CD38:BD FF D9 9D 00 FF BD FF 43
CD40:DA 9D 00 FF E8 D0 CD A9 80
CD48:20 8D 00 FF AD 86 02 8D 70
CD50:00 FF 20 CE CF AD 07 CD ED
CD58:F0 05 A2 00 20 D3 CE 4C 3C
CD60:FE CF AD 88 02 C9 FF D0 B5
CD68:0D A9 FF C9 3C D0 07 A9 6E
CD70:FF C9 40 D0 01 60 AD 88 01
CD78:02 8D 66 CD 85 27 AD 6C B2
CD80:CD 85 28 A5 27 C9 3F 90 33
CD88:0A 38 A5 27 E9 40 85 27 E0
CD90:4C 83 CD A5 28 C9 3F 90 BE
CD98:0A 38 A5 28 E9 40 85 28 02
CDA0:4C 93 CD A5 27 F0 0D 38 AA
CDA8:A5 27 E9 04 85 27 EE C6 CB
CDB0:CD 4C A3 CD A5 28 F0 0D 54
CDB8:38 A5 28 E9 04 85 28 EE F2
CDC0:CF CD 4C B4 CD A9 00 0A AB
CDC8:0A 0A 0A 8D C6 CD A9 00 C6

PROGRAMS

```

CDD0:0A 0A 0A 0A 8D CF CD AD CA
CDD8:18 D0 8D 11 CB 20 AD CC 7E
CDE0:AE 6C CD 8E CA CC 8E 19 51
CDE8:CD 8E FE CE 8E 49 CF 8E A3
CDF0:91 CF 8E 4B CD 8E 7D CF 43
CDF8:8E 6A CD 8E 8E D0 CC 8E 9E
CE00:1F CD 8E 04 CF 8E 4F CF D9
CE08:8E 97 CF 8E 8E D6 CC 8E 53
CE10:25 CD 8E 0A CF 8E 55 CF 59
CE18:8E 9D CF 8E 8E DC CC 8E FC
CE20:2B CD 8E 10 CF 8E 5B CF D8
CE28:8E A3 CF 8E FC CC 8E 32 43
CE30:CF 8E D5 CF 8E C6 CF AE EE
CE38:72 CD 8E E2 CC 8E 31 CD 53
CE40:8E 16 CF 8E 61 CF 8E A9 9E
CE48:CF 8E 83 CF 8E 70 CD 8E 3F
CE50:51 CD 8E 8E 8E CC 8E 37 DE
CE58:CD 8E 1C CF 8E 67 CF 8E 41
CE60:AF CF 8E 8E EE CC 8E 3D D4
CE68:CD 8E 22 CF 8E 6D CF 8E 2A
CE70:B5 CF 8E 8E F4 CC 8E 43 1E
CE78:CD 8E 28 CF 8E 73 CF 8E 13
CE80:BB CF 8E 38 CF 8E 02 CD CF
CE88:AE 88 02 CA 8E 16 CD 8E 83
CE90:46 CF 8E 8E C7 CC 8E FB D5
CE98:CE 8E 94 CF 8E 1C CD 8E DF
CEA0:4C CF 8E 8E CD CC 8E 01 1E
CEA8:CF 8E 9A CF 8E 22 CD 8E 49
CEB0:52 CF 8E 8E D3 CC 8E 07 67
CEB8:CF 8E A0 CF 8E 28 CD 8E 32
CEC0:58 CF 8E 8E D9 CC 8E 0D B0
CEC8:CF 8E A6 CF 8E C9 CF 8E 8D
CED0:D2 CF 60 A0 18 AD 6C CD FF
CED8:8D E4 CE A9 00 8D E3 CE B7
CEE0:A9 20 9D FF FF 18 AD E3 AE
CEE8:CE 69 28 8D E3 CE 90 03 A4
CEF0:EE E4 CE 88 10 EA 60 A2 31
CEF8:00 BD 28 FF 9D 00 FF BD B5
CF00:28 FF 9D 00 FF BD 28 FF AE
CF08:9D 00 FF BD 28 FF 9D 00 CE
CF10:FF BD 28 D8 9D 00 FF BD 5C
CF18:28 D9 9D 00 FF BD 28 DA 18
CF20:9D 00 FF BD 28 D8 9D 00 56
CF28:FF E8 D0 CD A2 27 A9 20 1E
CF30:9D C0 FF AD 86 02 9D C0 E1
CF38:FE CA 10 F2 20 CE CF 4C 63
CF40:FE CF A2 00 BD D8 FF 9D 96
CF48:00 FF BD D8 FF 9D 00 FF A3
CF50:BD D8 FF 9D 00 FF BD D8 33
CF58:FF 9D 00 FF BD D8 D7 9D FD
CF60:00 FF BD D8 D8 9D 00 FF 82
CF68:BD D8 D9 9D 00 FF BD D8 86
CF70:DA 9D 00 FF E8 D0 CD A2 AD
CF78:27 A9 20 9D 00 FF AD 86 D5
CF80:02 9D 00 FE CA 10 F2 20 15
CF88:CE CF 4C FE CF A2 00 BD C3
CF90:00 FF 9D 00 FF BD 00 FF DA
CF98:9D 00 FF BD 00 FF 9D 00 1E
CFA0:FF BD 00 FF 9D 00 FF BD 5A
CFA8:00 FF 9D 00 D8 BD 00 FF B9
CFB0:9D 00 D9 BD 00 FF 9D 00 71
CFB8:DA BD 00 FF 9D 00 DB E8 C2
CFC0:D0 CD A2 07 BD F8 FF 9D 70
CFC8:F8 FF CA 10 F7 60 A2 07 CC
CFD0:BD F8 FF 9D F8 FF CA 10 D4
CFD8:F7 60 AD 27 CC AE 24 CC EA
CFE0:8D F5 CF 8E F7 CF A9 16 10
CFE8:4A AA E8 E8 E8 8D 27 CC 9C
CFF0:8E 24 CC 60 A9 FF A2 FF 13
CFF8:8D 27 CC 8E 24 CC 60 00 C0

```

DEMO

```

DA 10 REM PIXEL MOVER DEMO
DR 20 REM COPYRIGHT 1992 - COM
    PUTE PUBLICATIONS INTL L
    TD - ALL RIGHTS RESERVED
JD 30 REM
KJ 40 A=A+1:IF A=1 THEN LOAD"P
    IXEL MOVER",8,1
PM 50 SA= 51888:EN= SA+125:XP=
    SA+87:YP= SA+92:D1= SA+
    375:D2= SA+372:WR= SA+59
    9
AS 60 SP= SA+211:TK= SA+51:B1=
    53280:B2= 53281:SC= PEE
    K(648)*256
PR 70 EF= -65536:P= 1000:S2= 5
    1700:C= 0:CK =C:X= 782:Y
    = 781
RJ 80 SP$="{22 SPACES}":REM 22
    SPACES
HA 90 REM ---- ML CHROUT WEDGE
    ----
AH 100 REM (TOTALLY RELOCATABLE;
    SET S2 TO START ADDR
    ESS OF WEDGE)
HR 110 DATA 141,-16,142,-18,14
    0,-20,165,154,201,3,240
    ,9,169,0,162,0,160,0,76
EP 120 DATA 202,241,173,-16,20
    1,13,240,4,201,17,208,2
    36,164,214,192,24,208,2
    30
QD 130 DATA 169,0,170,160,8,32
    ,-1112,198,214,32,16,22
    9,76,-15,-65536
CB 140 REM ----
AJ 150 READA:ZA=ABS(A):IFA=EFT
    HEN220
QH 160 CK=CK+ZA:IFSGN(A)=-1THE
    N180
JR 170 POKES2+C,A:C=C+1:POKE B
    1,A:GOTO150
MM 180 IFZA>1000THENZ=SA+ZA-1
    000:GOTO200
CC 190 ZZ=S2+ZA
FG 200 HI=INT(ZZ/256):LO=ZZ-HI
    *256:POKES2+C,LO:POKES2
    +C+1,HI:C=C+2:GOTO150
DF 210 REM ----
JF 220 IF CK<>7031THEN PRINT"E
    RROR IN DATA STATEMENTS
    !":STOP
AF 230 SYS TK:SYS 65418:SYS SA
MP 240 HI=INT(S2/256):LO=S2-HI
    *256:POKE 806,LO:POKE 8
    07,HI:REM SET NEW VECTO
    R
DQ 250 POKE B1,0:POKE B2,0:POK
    E 648,224:PRINT"{4}
    {CLR}":POKE648,SC/256
PQ 260 POKE SP,0:POKE YP,23:RE
    M ENTER 24 ROW MODE
RR 270 POKE D2,18:SYS EN,0,200
    :POKE D2,30
MA 280 PRINT"{8}{CLR}":GOSUB11
    10
BE 290 PRINT SPC(14)"{13 P}"

```

```

ES 300 PRINT SPC(14)"{5}{RVS}
    {SPACE}PIXEL MOVER "
KE 310 PRINT SPC(14)"{4}{13 Y}
    {8}"
JX 320 PRINT:PRINT "{2 SPACES}
    COPYRIGHT 1992 BY COMPU
    TE PUBLICATIONS"
RD 330 PRINT:PRINT "{3 SPACES}
    WELCOME TO PIXEL MOVER,
    THE SMOOTH"
CR 340 PRINT"SCROLLING PROGRAM
    FOR THE COMMODORE 64!"
GM 350 PRINT"WITH PIXEL MOVER,
    YOU CAN SMOOTHLY"
AG 360 PRINT"SCROLL THE WHOLE
    {SPACE}SCREEN ONE PIXEL
    AT A"
CC 370 PRINT"TIME IN ALL EIGHT
    DIRECTIONS, EVEN"
CK 380 PRINT"FROM BASIC!{YEL}"
GD 390 PRINT:PRINTSPC(6)"PRESS
    A KEY TO CONTINUE...."
EC 400 SYS EN,0,40
DP 410 GETA$:IF A$="" THEN410
MD 420 SYS EN,0,152
SE 430 POKE WR,1:POKE D1,19:PO
    KE D2,19:POKE XP,192:PO
    KE YP,19
FM 440 PRINT"{5}{CLR}":GOSUB11
    20
GP 450 X1=9:Y1=8:GOSUB1170:PRI
    NTLEFT$(SP$,21);
XB 460 PRINT SPC(19)" {6}PRESS
    A NUMBER FROM{5} ";
RG 470 PRINT SPC(19)" {6}1 TO
    {SPACE}8 FOR A
    {7 SPACES}{5} ";
JK 480 PRINT SPC(19)" {6}DIFFE
    RENT SCROLL{3 SPACES}
    {5} ";
XD 490 PRINT SPC(19)" {6}DIREC
    TION. PRESS C {5} ";
GD 500 PRINT SPC(19)" {6}TO CO
    NTINUE....{4 SPACES}{5}
    ";
HC 510 PRINT SPC(19)LEFT$(SP$,
    21);
KH 520 GETA$:IFA$="C"THEN580
XX 530 IF A$="" THEN520
AF 540 V= VAL(A$):IF V<1 OR V>
    8 THEN520
GR 550 IF V=3 THEN SYS EN,2,32
    0:GOTO440
RF 560 IF V=7 THEN SYS EN,6,32
    0:GOTO440
AE 570 SYS EN,V-1,200:GOTO440
KQ 580 PRINT "{5}{CLR}":GOSUB1
    110:POKE YP,23:POKE D2,
    30
XG 590 PRINT"{4 SPACES}THE HOR
    IZONTAL AND VERTICAL"
SB 600 PRINT" SCROLLING SPEED
    {SPACE}CAN BE CHANGED"
FA 610 PRINT"FOR....":SYS EN,
    0,40
ES 620 POKE D1,1:POKE D2,1:REM
    ADJUST DELAY TIMING VA
    LUE

```



```

KR 630 PRINT SPC(11)"FASTER SC
ROLLING...."
FJ 640 SYS EN,0,88:SYS EN,2,32
0
QX 650 POKE D1,40:POKE D2,40
BX 660 PRINT SPC(8)"OR SLOWER
{SPACE}SCROLLING...."
DB 670 SYS EN,0,88:SYS EN,6,24
0
JQ 680 POKE YP,19:POKE D1,18:P
OKE D2,18:POKE WR,0:PRI
NT"{5}{CLR}";:GOSUB1120
JH 690 X1=11:Y1=10:GOSUB1170
RB 700 PRINT "{6}YOU CAN ALSO
{SPACE}HAVE{5} ";
AP 710 PRINT SPC(21)" {6}HORIZ
ONTAL SCROLL{5} ";
CH 720 PRINT SPC(21)" {6}WRAP
{SPACE}ON....{6 SPACES}
{5} ";
RF 730 SYS EN,2,320
PD 740 X1=11:Y1=14:GOSUB1170:P
RINT "{YEL}{2 SPACES}HI
T A KEY.... {5}
{2 SPACES}"
PM 750 GET A$:IF A$="" THEN750
MH 760 X1=19:Y1=13:GOSUB1170:P
RINT "{6} OR OFF."
FQ 770 X1=11:Y1=14:GOSUB1170:P
RINT "{5}++++++"
JR 780 POKE WR,1:SYS EN,6,320
XH 790 POKE SP,1:REM SET TO 8
{SPACE}PIXEL SCROLLING
BB 800 POKE D1,30:POKE D2,30
HB 810 PRINT "{5}{CLR}":GOSUB11
20
AM 820 X1=9:Y1=9:GOSUB1170
XQ 830 PRINT "{6}YOU CAN SCROL
L EIGHT{5} ";
KB 840 PRINTSPC(18)" {6}PIXELS
AT A TIME... {5} ";
AQ 850 PRINTSPC(18)" {6}ENTER
{SPACE}A NUMBER
{6 SPACES}{5} ";
KQ 860 PRINTSPC(18)" {6}BETWEE
N 1 AND 8.{4 SPACES}{5}
";
DA 870 PRINTSPC(18)" {6}PRESS
{SPACE}C TO CONTINUE.
{5} "
EQ 880 GET A$:IF A$="C"THEN930
XS 890 V=VAL(A$):IF V<1 OR V>8
THEN880
CR 900 IF V=3 THEN SYS EN,2,40
:GOTO810
PF 910 IF V=7 THEN SYS EN,6,40
:GOTO810
CX 920 SYS EN,V-1,25:GOTO810
CK 930 POKE YP,23:POKE SP,0:PO
KE D1,18:POKE D2,18:POK
E XP,200
QA 940 PRINT "{5}{CLR}":GOSUB11
10:POKE D2,30
GJ 950 PRINT "{5 SPACES}PIXEL M
OVER SUPPORTS THESE"
KP 960 PRINT "{2 SPACES}FEATURE
S FOR OPTIMAL COMPATIBI

```

```

LITY"
CE 970 PRINT "{2 SPACES}AND FLE
XIBILITY:"PRINT
JG 980 PRINT "{2 SPACES}{4}*{8}
YOU CAN CHANGE THE SCR
EEN MEMORY"
DR 990 PRINT "{4 SPACES}OR THE
{SPACE}VIDEO BANK AND P
IXEL MOVER"
XF 1000 PRINT "{4 SPACES}WILL A
DAPT TO THESE CHANGES.
"
CB 1010 PRINT:PRINT "{2 SPACES}
{4}*{8} THE {3}PIXEL M
OVER RELOCATOR{8} WILL
"
RG 1020 PRINT "{4 SPACES}RELOCA
TE A COPY OF PIXEL MOV
ER TO"
QF 1030 PRINT "{4 SPACES}ANY LO
CATION IN MEMORY."
QA 1040 PRINT:PRINTSPC(5)"{6}H
IT {YEL}{RVS} SPACE
{OFF}{6} TO RESTART TH
IS"
PD 1050 PRINTSPC(3)"DEMO. HIT
{SPACE}ANY OTHER KEY T
O QUIT."
XA 1060 SYS EN,0,40
AE 1070 GET A$:IF A$="" THEN10
70
XB 1080 IF A$="" THEN230
GH 1090 POKE YP,24:SYS TK:SYS
{SPACE}65418:SYS 65409
:END
CC 1100 REM ----
FG 1110 X1=0:Y1=24:GOSUB1170:R
ETURN:REM PLOT CURSOR
{SPACE}TO BOTTOM OF SC
REEN
AS 1120 POKE YP,PEEK(YP)AND239
QD 1130 PRINT "{HOME}{A}{38 R}
{S}";
JP 1140 FORI=1 TO 23:PRINT "{Q}
++++++"
++++++{W}";:
NEXT
PD 1150 ZZ=SC+960:POKE ZZ,109:
FOR I=ZZ+1 TO ZZ+38:PO
KE I,113:NEXT:POKE ZZ+
39,125
KR 1160 PRINT "{HOME}";:POKE YP
,PEEK(YP)OR16:RETURN
BH 1170 POKE X1:POKEY,Y1:SYS5
8636:RETURN

```

RELOCATOR

```

0801:0E 08 6E 19 9E 20 28 32 71
0809:30 36 34 29 00 00 00 78 50
0811:A2 FF 9A 20 A3 FD 20 15 32
0819:FD 20 5B FF 58 A2 09 BD B8
0821:6F 0D 9D 00 80 CA 10 F7 27
0829:A9 05 20 D2 FF A9 93 20 6E
0831:D2 FF A9 00 20 90 FF A9 CC
0839:06 8D 20 D0 8D 21 D0 A2 F5
0841:02 A0 09 18 20 F0 FF A9 8B
0849:0F 8D 86 02 A9 AF 20 60 E1
0851:0C A9 98 A0 0D 20 1E AB BF

```

```

0859:20 68 0C A9 0B 8D 86 02 4D
0861:A9 B7 20 60 0C 18 A0 02 42
0869:A2 06 20 F0 FF A9 B5 A0 12
0871:0D 20 1E AB 18 A0 00 A2 74
0879:09 20 F0 FF AD 6E 0D F0 66
0881:03 4C EB 08 A9 DA A0 0D 2B
0889:20 1E AB A0 04 A2 0A 18 87
0891:20 F0 FF A9 03 A0 0E 20 5F
0899:1E AB 20 73 0C 20 73 0C B2
08A1:20 E4 FF F0 FB A9 23 A0 77
08A9:0E 20 1E AB A9 05 A6 BA B0
08B1:A0 FF 20 BA FF A9 10 A2 2B
08B9:78 A0 0D 20 BD FF A9 00 13
08C1:20 D5 FF A5 90 30 04 29 28
08C9:0F F0 1F A9 31 A0 0E 20 64
08D1:1E AB A9 49 A0 0E 20 1E 41
08D9:AB 20 E4 FF C9 59 F0 07 01
08E1:C9 4E D0 F5 6C FC FF 4C 87
08E9:10 08 A9 01 8D 6E 0D A9 33
08F1:5A A0 0E 20 1E AB A9 00 0E
08F9:8D ED 0C 85 CC A9 01 8D C2
0901:86 02 20 E4 FF F0 FB C9 AE
0909:0D F0 21 C9 14 F0 0D A2 BF
0911:0F DD 88 0D F0 20 CA 10 B1
0919:F8 4C 03 09 AD ED 0C F0 D9
0921:E1 A9 14 20 D2 FF CE ED 35
0929:0C 4C 03 09 AD ED 0C C9 4C
0931:04 90 CF 4C 58 09 AE ED 5A
0939:0C 9D EE 0C 2D D2 FF EE 92
0941:ED 0C AD ED 0C C9 04 D0 42
0949:B9 20 E4 FF C9 14 F0 CC 2A
0951:C9 0D F0 D8 4C 4A 09 A9 7E
0959:01 85 CC A9 20 D2 FF A8
0961:AE EE 0C AC EF 0C 20 78 3B
0969:0C 8D E6 0C AE F0 0C AC 80
0971:F1 0C 20 78 0C 8D E5 0C 79
0979:20 73 0C A9 71 A0 0E 20 DE
0981:1E AB 20 9B 0A A9 81 A0 E5
0989:0E 20 1E AB A9 00 85 CC 4E
0991:8D ED 0C 20 E4 FF C9 0D 31
0999:F0 26 C9 14 F0 2A C9 20 0C
09A1:90 F1 C9 80 B0 03 4C AE 92
09A9:09 C9 A0 90 E6 AE ED 0C A9
09B1:E0 10 F0 DF 20 D2 FF 9D 3E
09B9:B3 0E EE ED 0C 4C 94 09 A9
09C1:AD ED 0C F0 CE 4C DE 09 25
09C9:AE ED 0C F0 C6 A9 14 20 64
09D1:D2 FF A9 00 9D B3 0E CE 29
09D9:ED 0C 4C 94 09 A9 01 85 2F
09E1:CC A9 20 20 D2 FF 20 73 15
09E9:0C A9 95 A0 0E 20 1E AB 02
09F1:AE ED 0C A0 0D B9 AF 0E B6
09F9:9D B3 0E EE ED 0C E8 C8 B2
0A01:C0 04 D0 F1 18 AD E7 0C 03
0A09:6D E9 0C 8D F4 0C AD E8 C4
0A11:0C 6D EA 0C 8D F5 0C AD AE
0A19:E9 0C AE EA 0C 85 FD 86 A2
0A21:FE A9 00 85 90 AD ED 0C 9A
0A29:A2 B3 A0 0E 20 BD FF A9 12
0A31:05 A6 BA A0 05 20 BA FF F0
0A39:20 C0 FF A5 90 30 04 29 5E
0A41:0F F0 03 4C AB 0C A2 05 16
0A49:20 C9 FF AD E5 0C 20 D2 2D
0A51:FF AD E6 0C 20 D2 FF A0 5B
0A59:00 B1 FD 20 D2 FF A5 90 0E
0A61:30 04 29 0F F0 03 4C AB 7C
0A69:0C E6 FD D0 02 E6 FE 38 EB
0A71:AD F4 0C E5 FD 8D F3 0C 93
0A79:AD F5 0C E5 FE 0D F3 0C E1
0A81:B0 D7 A9 05 20 C3 FF 20 99

```



```

0A89:CC FF 20 73 0C 20 73 0C 13
0A91:A9 A1 A0 0E 20 1E AB 4C F4
0A99:DA 08 20 1E 0C 20 A4 0A 37
0AA1:4C D6 0B 18 AD E3 0C 6D F6
0AA9:E7 0C 8D EB 0C AD E4 0C 12
0AB1:6D E8 0C 8D EC 0C A0 00 E9
0AB9:A2 00 B1 FD DD 3B 0D F0 1C
0AC1:2B E8 E0 30 D0 F6 A2 00 6C
0AC9:DD F8 0C F0 10 E8 E0 4F D0
0AD1:D0 F6 91 FB 20 E0 0B 20 B8
0AD9:F4 0B 4C B7 0A 91 FB 20 DE
0AE1:E0 0B B1 FD 91 FB 20 E0 DC
0AE9:0B 4C D8 0A 91 FB 20 E0 EF
0AF1:0B B1 FD 8D ED 0C 20 E6 57
0AF9:0B B1 FD 8D EE 0C 20 E6 67
0B01:0B 38 AD EB 0C ED ED 0C 1F
0B09:8D EF 0C AD EC 0C ED EE A0
0B11:0C 0D EF 0C 90 50 38 AD 13
0B19:E3 0C ED ED 0C 8D EF 0C 43
0B21:AD E4 0C ED EE 0C 0D EF 59
0B29:0C B0 3B 38 AD ED 0C ED 87
0B31:E3 0C 8D EF 0C AD EE 0C ED
0B39:ED E4 0C 8D F0 0C 18 AD 6F
0B41:E5 0C 6D EF 0C 8D F1 0C 80
0B49:AD E6 0C 6D F0 0C 8D F2 0E
0B51:0C A0 00 AD F1 0C 91 FB 4F
0B59:20 ED 0B AD F2 0C 91 FB 1E
0B61:20 ED 0B 4C D8 0A A0 00 59
0B69:AD ED 0C 91 FB 20 ED 0B B3
0B71:AD EE 0C 91 FB 20 ED 0B FB
0B79:4C D8 0A A0 00 B1 FD 8D 87
0B81:ED 0C C8 B1 FD 8D EF 0C D7
0B89:C8 B1 FD 8D EE 0C C8 B1 F3
0B91:FD 8D F0 0C 38 AD EF 0C 4D
0B99:ED E3 0C 8D EF 0C AD F0 F5
0BA1:0C ED E4 0C 8D F0 0C 18 F6
0BA9:AD EF 0C 6D E5 0C 8D EF 55
0BB1:0C AD F0 0C 6D E6 0C 8D C4
0BB9:F0 0C A0 00 AD ED 0C 91 2E
0BC1:FB C8 AD EF 0C 91 FB C8 24
0BC9:AD EE 0C 91 FB C8 AD F0 5C
0BD1:0C 91 FB C8 60 20 1E 0C 2A
0BD9:AD F7 0C 20 33 0C 60 20 F2
0BE1:E6 0B 4C ED 0B E6 FD D0 57
0BE9:02 E6 FE 60 E6 FB D0 02 6B
0BF1:E6 FC 60 38 A5 FB ED E9 2D
0BF9:0C 8D ED 0C A5 FC ED EA DF
0C01:0C 8D EE 0C 38 AD ED 0C 81
0C09:ED E7 0C 8D EF 0C AD EE 66
0C11:0C ED E8 0C 0D EF 0C B0 79
0C19:01 60 68 68 60 AD E3 0C EA
0C21:AE E4 0C 85 FD 86 FE AD 59
0C29:E9 0C AE EA 0C 85 FB 86 B2
0C31:FC 60 8D ED 0C A9 00 8D 05
0C39:EE 0C 18 AD EA 0C 6D ED F1
0C41:0C 85 FB AD E9 0C 6D EE 6C
0C49:0C 85 FC 18 AD E3 0C 6D 6C
0C51:ED 0C 85 FD AD E4 0C 6D 7A
0C59:EE 0C 85 FE 4C 7C 0B A2 99
0C61:17 20 D2 FF CA D0 FA 38 2F
0C69:20 F0 FF E8 A0 09 18 4C 02
0C71:F0 FF A9 D0 4C D2 FF 8E 44
0C79:F4 0C 8C F5 0C A0 00 AD 90
0C81:F4 0C D9 88 0D F0 03 C8 D5
0C89:D0 F8 98 0A 0A 0A 0A 8D 16
0C91:F3 0C A2 00 AD F5 0C DD 36
0C99:88 0D F0 03 E8 D0 F8 8A 8E
0CA1:0D F3 0C 8D F3 0C AD F3 B6
0CA9:0C 60 A9 05 20 C3 FF 20 95
0CB1:CC FF 20 73 0C A9 31 A0 75

```

```

0CB9:0E 20 1E AB A9 49 A0 0E 21
0CC1:20 1E AB 20 E4 FF C9 59 FC
0CC9:F0 07 C9 4E D0 F5 4C 10 41
0CD1:08 4C 05 0A A9 00 8D 04 AE
0CD9:80 8D 05 80 8D 06 80 6C 30
0CE1:FC FF B0 CA 00 40 4F 05 DF
0CE9:00 40 00 00 00 00 00 12
0CF1:00 00 00 00 00 00 1F A9 F1
0CF9:A2 A0 A5 B5 A1 B1 A4 B4 6D
0D01:A6 B6 B0 F0 90 C9 C5 D5 4E
0D09:C1 D1 D0 A6 B6 85 95 81 75
0D11:91 84 94 86 96 C6 D6 E6 74
0D19:F6 C0 C4 CC E0 E4 EC E9 A2
0D21:E5 F5 E1 F1 69 65 75 61 34
0D29:71 30 10 29 25 35 21 31 0E
0D31:09 05 15 01 11 49 45 55 51
0D39:41 51 AD BD B9 AC BC 20 F3
0D41:CD DD D9 AE BE 4C 6C 8D 6D
0D49:9D 99 8C 8E CE DE EE FE E1
0D51:CC EC ED FD F9 6D 7D 79 A4
0D59:2D 3D 39 0D 1D 19 4D 5D 96
0D61:59 2C 2E 3E 6E 7E 4E 5E 45
0D69:0E 1E A9 A2 A0 00 D5 0C 2E
0D71:10 08 C3 C2 CD 38 30 50 3A
0D79:49 58 45 4C 20 4D 4F 56 E6
0D81:45 52 2E 4F 42 4A 2A 30 4D
0D89:31 32 33 34 35 36 37 38 9B
0D91:39 41 42 43 44 45 46 47 67
0D99:08 12 98 20 50 49 58 45 EE
0DA1:4C 20 4D 4F 56 45 52 20 15
0DA9:52 45 4C 4F 43 41 54 4F D3
0DB1:52 20 92 00 9A 43 4F 50 20
0DB9:59 52 49 47 48 54 20 31 B7
0DC1:39 39 31 20 42 59 20 48 EE
0DC9:4F 4E 47 20 58 48 41 4D 7D
0DD1:2F 56 39 31 31 31 32 32 38
0DD9:00 05 49 4E 53 45 52 54 EB
0DE1:20 57 4F 52 4B 20 44 49 9D
0DE9:53 4B 20 43 4F 4E 54 41 56
0DF1:49 4E 49 4E 47 20 50 49 F6
0DF9:58 45 4C 20 4D 4F 56 45 B6
0E01:52 00 54 48 45 4E 20 50 49
0E09:52 45 53 53 20 41 20 4B D0
0E11:45 59 20 54 4F 20 43 4F 40
0E19:4E 54 49 4E 55 45 2E 2E C9
0E21:2E 00 9F 4C 4F 41 44 49 5E
0E29:4E 47 2E 2E 2E 2E 0D 00 2B
0E31:0D 9E 2D 2D 2D 2D 2D 44 96
0E39:49 53 4B 20 45 52 52 4F A1
0E41:52 20 2D 2D 2D 2D 00 00 3F
0E49:54 52 59 20 41 47 41 49 44
0E51:4E 20 28 59 2F 4E 29 3F 7B
0E59:00 0D 9A 52 45 4C 4F 43 6E
0E61:41 54 45 20 41 44 44 52 D3
0E69:45 53 53 20 3A 20 24 00 04
0E71:9F 52 45 4C 4F 43 41 54 BD
0E79:49 4E 47 2E 2E 2E 0D 00 DD
0E81:0D 9A 53 41 56 45 20 46 97
0E89:49 4C 45 20 4E 41 4D 45 5F
0E91:3A 20 05 00 9F 53 41 56 96
0E99:49 4E 47 2E 2E 2E 00 40
0EA1:41 4E 4F 54 48 45 52 20 3D
0EA9:28 59 2F 4E 29 00 2C 50 EC
0EB1:2C 57 00 00 00 00 00 00 B9
0EB9:00 00 00 00 00 00 00 00 D5
0EC1:00 00 00 00 00 00 00 00 DD

```

Hong Pham is the author of Ramdrive 64 (November 1991). He moves pixels in Antigonish, Nova Scotia, Canada.

BATCH FILE 64

By Cameron Kaiser

Most computers, with the exception of the 64 and 128, offer a provision for running batch files. A batch file contains one or more instructions that are executed as if they were being typed on the keyboard. IBM users will recognize a batch file called AUTOEXEC, the one which automatically executes as the computer is booted.

A batch file is useful because it allows the computer to store and remember sequences and commands for you. Then every time that file is run, the computer executes those commands. For example, you could create a batch file to run a program that requires a special way of starting; it might call for a SYS address that's difficult to remember. All you'd have to do is load the batch file, and it would load the program and issue the necessary SYS command.

Typing It In

Batch File 64 gives you the power to create batch files that can run on their own, without the batch file creator. The program consists of two sections: BF64, a BASIC program, and Pbax, a machine language routine.

The first part, BF64, is written entirely in BASIC. To avoid typing errors, use The Automatic Proofreader to enter it. See "Typing Aids" elsewhere in this section. Be sure to save a copy of BF64 before you run it.

Pbax is the machine language portion of the program. To enter it, use MLX, our machine language entry program; see "Typing Aids" again. Be sure to save Pbax on the same disk as BF64. Save it with the filename PBAX because BF64 loads that filename when it executes.

Getting Started

To begin, load and run BF64. On the opening screen, you'll see a reminder about a couple of POKes and the message indicating 1278 free bytes. We'll look at these later.

You'll then see a prompt that indicates line 1. This is where you enter the first line of your batch file. This can be any legal command, program line, or code found in Commodore BASIC. The only stipulation is that a line must

not exceed 75 characters in length.

When you've finished with the first line, press Return. The computer will pause while it commits the statement to memory. Then a prompt for line 2 will appear.

Enter the second line of your batch file, remembering the 75-character limit. Press Return at the end of the line. Continue in this manner until you've entered all of your desired commands. The computer won't let you exceed the 1278 bytes that are available for these commands. If you exceed that number, you'll get an error message. To determine how many bytes remain, press Ctrl-B on an empty line.

Type Carefully

Before you press Return, be very sure that what you have onscreen is what you want to see echoed in your batch file. You cannot edit a line once it has been entered into memory.

Another thing to be aware of is that the computer acts as though it were in perpetual quote mode, that odd state where the 64 echoes cursor commands as reversed characters. If you try to cursor back to something on the line you're working on, all you'll get is a bunch of reversed control codes. To go back and change something, use the Del key.

Because the batch file program replaces part of the 64's operating system, you need to turn off Batch File 64 before running some programs. To do this, make sure that the last line of your batch file looks like this next line.

POKE 788,49:POKE 789,234: final command

In this case, *final command* is the last command of the program. For example, to run a BASIC program called Spectre, you could use the batch file below. Since RUN is the last command, enter the POKes just before it.

**LOAD "SPECTRE",8
POKE788,49: POKE789,234: RUN**

When you've finished entering your batch file, press Ctrl-A on a blank line. The computer will ask you if you really want to stop. If you've finished entering commands, press Y. If you wish to continue, press N.

Saving Files

Insert a disk to save the batch file. The computer will prompt you for a filename and a two-character ID. Enter these. The computer will process the code, save it to disk, and reset itself.

Running Files

To try out your batch file, load the filename with the ,8,1 extension. If all goes well, you should see SYSC:NEW and the commands of the batch file printed rapidly to the screen and entered into the computer.

Every effort has been made to make sure that Batch File 64 won't interfere with any program it loads. That doesn't mean that it's foolproof, however. Any program that modifies locations above \$CA00 (51712) will cause erratic behavior at best and a complete system crash at worst unless the batch file program has been taken out of the way. If you want to load a program that does this, use a batch file like the one below.

**IF A THEN SYS address
A=1: LOAD "filename",8,1
POKE788,49: POKE789,234: RUN**

In this example, *filename* is the machine language program being called, and *address* is its starting address.

Deleting Files

To delete a batch file, you must erase three files. The first filename is the one that you originally named and saved, the second is the same with M added as its first letter, and the third is BS plus the two-letter ID. For example, if the batch file you created was called ZORBA and the ID was ZB, then you would have to delete the files named ZORBA, MZORBA, and BSZB.

BF64

```
CP 1 REM COPYRIGHT 1992 - COMP
    UTE PUBLICATIONS INTL LTD
    - ALL RIGHTS RESERVED
AQ 5 IFA=0THENA=1:LOAD"PBAX",8
    ,1
AX 10 POKE53272,23:POKE648,4:P
    OKE56576,151:PRINT"{CLR}
    {7}{N}{H}{K}";:POKE53280
    ,14:POKE53281,6
XP 20 PRINT"{3 DOWN}BATCH FILE
    CREATOR{DOWN}"
RB 30 PRINT"ENTER POKE788,49:P
```

```
OKE789,234:"
FX 35 PRINT"BEFORE THE FINAL C
    OMMAND.
KJ 40 PRINT
AH 50 PRINT"{DOWN}1278 BYTES F
    REE":PRINT:BF=1278:LN=1
HD 60 SPIEL$=""
HF 70 PRINTLN"{LEFT}:";:POKE20
    4,.
FR 80 POKE198,0:WAIT198,1:GETA
    S
JX 90 IFLEN(SPS)=0AND(AS=CHRS(
    13)ANDAS=CHRS(20))THEN80
MK 92 IFLEN(SPS)=75ANDAS<>CHRS
    (20)ANDAS<>CHRS(13)THEN8
    0
SE 93 IFA$=CHRS(13)THEN130
KR 94 IFA$="{A}"THENPOKE204,1:
    POKE212,,:PRINT" ":GOTO1
    90
KB 95 IFA$="{B}"THENPOKE204,1:
    POKE212,,:PRINT" ":GOTO1
    82
PK 100 POKE212,1:PRINTAS;
XH 110 IFA$<>CHRS(20)ANDAS<>CH
    RS(13)THENSPP$=SP$+AS:GO
    TO80
FS 120 IFA$=CHRS(20)THENSPP$=LE
    FT$(SP$,LEN(SPS)-1):GOT
    O80
MD 130 POKE204,1:POKE212,,:PRI
    NT" ":SP$=SP$+CHRS(13)
PD 140 Z=LEN(SPIEL$):IFBF-Z<=0
    THENPRINT"OVERFLOW -- R
    ETYPE LINE OR QUIT":GOT
    O60
SH 150 FORX=0TOLEN(SPS)-1
FC 160 POKE51969+(1278-BF),ASC
    (MID$(SP$,X+1,1)+CHRS(0
    )):BF=BF-1
PA 170 NEXTX:POKE51969+(1278-B
    F),0
XP 180 LN=LN+1:GOTO60
RC 182 PRINT"{DOWN}{LEFT}"BF"B
    YTES FREE{DOWN}":GOTO60
RJ 190 PRINT"{DOWN}VERIFY -- A
    RE YOU FINISHED? (Y/N)"
HP 200 WAIT198,1:GETAS:IFA$<>
    "Y"ANDAS<>"N"THEN200
MS 210 IFA$="N"THENPRINT:GOTO6
    0
RC 220 PRINT"{CLR}{9 DOWN}ENTE
    R A FILENAME FOR THIS B
    ATCH FILE:"
FX 222 OPEN2,0:INPUT#2,A$:CLOS
    E2:PRINT
GE 230 PRINT"ENTER AN 2 CHARAC
    TER ID:"POKE204,.
PR 240 WAIT198,1:GETCS:PRINTCS
    ;:WAIT198,1:GETDS:PRINT
    DS:POKE204,1:POKE198,0
XA 250 QS="M"+AS:SYS57812QS,8,
    1:POKE193,0:POKE194,202
    :POKE174,253:POKE175,20
    7
SC 260 SYS62954:POKE51699,ASC(
    "S"):POKE51700,ASC(C$):
    POKE51701,ASC(D$)
```


PROGRAMS

```
AB 270 OPEN1,8,2,"0:"+"A$+",P,W
"
QC 280 PRINT#1,CHR$(0)CHR$(1);
:FORX=51389TO51711:PRIN
T#1,CHR$(PEEK(X));:NEXT
CR 290 CLOSE1
JE 300 PRINT"{CLR}{BLU}10 IFA=
0THENA=1:LOAD"CHR$(34)Q
$CHR$(34)"",8,1"
HC 301 PRINT"20 A$="CHR$(34)"S
YSC:NEW"CHR$(34)"+"CHR$(
13):POKE198,9"
MH 310 PRINT"30 FORX=1TO9:POKE
630+X,ASC(MID$(A$,X,1))
:NEXT:C=51712:POKE828,0
"
AK 320 PRINT"40 SYS828"
XC 330 PRINT"SAVE"CHR$(34)"BS"
CSD$CHR$(34)"",8"
KX 340 PRINT"{3 DOWN}SYS64738"
XD 350 POKE198,7:POKE631,19:FO
RX=1TO6:POKE631+X,13:NE
XTX:NEW
```

PBAX

```
C8BD:02 02 02 02 02 02 02 02 4F
C8C5:02 02 02 02 02 02 02 02 57
C8CD:02 02 02 02 02 02 02 02 5F
C8D5:02 02 02 02 02 02 02 02 67
C8DD:02 02 02 02 02 02 02 02 6F
C8E5:02 02 02 02 02 02 02 02 77
C8ED:02 02 02 02 02 02 02 02 7F
C8F5:02 02 02 02 02 02 02 02 87
C8FD:02 02 02 02 02 02 02 02 8F
C905:02 02 02 02 02 02 02 02 98
C90D:02 02 02 02 02 02 02 02 A0
C915:02 02 02 02 02 02 02 02 A8
C91D:02 02 02 02 02 02 02 02 B0
C925:02 02 02 02 02 02 02 02 B8
C92D:02 02 02 02 02 02 02 02 C0
C935:02 02 02 02 02 02 02 02 C8
C93D:02 02 02 02 02 02 02 02 D0
C945:02 02 02 02 02 02 02 02 D8
C94D:02 02 02 02 02 02 02 02 E0
C955:02 02 02 02 02 02 02 02 E8
C95D:02 02 02 02 02 02 02 02 F0
C965:02 02 02 02 02 02 02 02 F8
C96D:02 02 02 02 02 02 02 02 01
C975:02 02 02 02 02 02 02 02 09
C97D:02 02 02 02 02 02 02 02 11
C985:02 02 02 02 02 02 02 02 19
C98D:02 02 02 02 02 02 02 02 21
C995:02 02 02 02 02 02 02 02 29
C99D:02 02 02 02 02 02 02 02 31
C9A5:02 02 02 02 02 02 02 02 39
C9AD:02 02 02 02 02 02 02 02 41
C9B5:02 02 02 02 02 02 02 02 49
C9BD:02 02 02 02 02 02 02 02 4F
C9C5:A9 02 A6 BA A0 01 20 BA 33
C9CD:FF A9 04 A2 35 A0 02 20 C6
C9D5:BD FF A2 FF A0 FF A9 00 F4
C9DD:20 D5 FF 86 2D 84 2E A9 E0
C9E5:00 85 7A A9 08 85 7B 20 32
C9ED:60 A6 4C AE A7 42 4F 4F 04
C9F5:54 A9 0A 85 14 A9 99 E0 13
C9FD:84 FF 0E A9 00 85 FD A9 EB
CA05:CB 85 FE A9 19 8D 14 03 86
CA0D:A9 CA 8D 15 03 A9 01 85 73
CA15:FB 85 FC 60 A5 FC C9 00 64
```

```
CA1D:F0 14 A4 FB B1 FD 8D 77 9C
CA25:02 C8 D0 02 E6 FE 85 FC 63
CA2D:84 FB A9 01 85 C6 4C 31 5A
CA35:EA 00 FF 00 7F BB FF 00 2B
CA3D:FF 00 18 00 00 00 00 00 D5
```

Cameron Kaiser writes batches of files and other interesting programs in La Mesa, California. □

TYPING AIDS

MLX, our machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. To make room for more programs, we no longer include these labor-saving utilities in every issue, but they can be found on each *Gazette Disk* and are printed in all issues of *Gazette* through June 1990.

If you don't have access to a back issue or to one of our disks, write to us, and we'll send you free copies of both of these handy programs. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408.

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COMPUTE Publications
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Greensboro, NC 27408

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 Follansbee, WV

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